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**Synopsis of
Nearctic Ichneumoninae
Stenopneusticae with
Particular Reference to the
Northeastern Region
(Hymenoptera)**

Part I.

**Introduction, Key to Nearctic Genera of Ichneumoninae
Stenopneusticae, and Synopsis of the Protichneumonini
North of Mexico**

by

GERD H. HEINRICH

Dryden, Maine

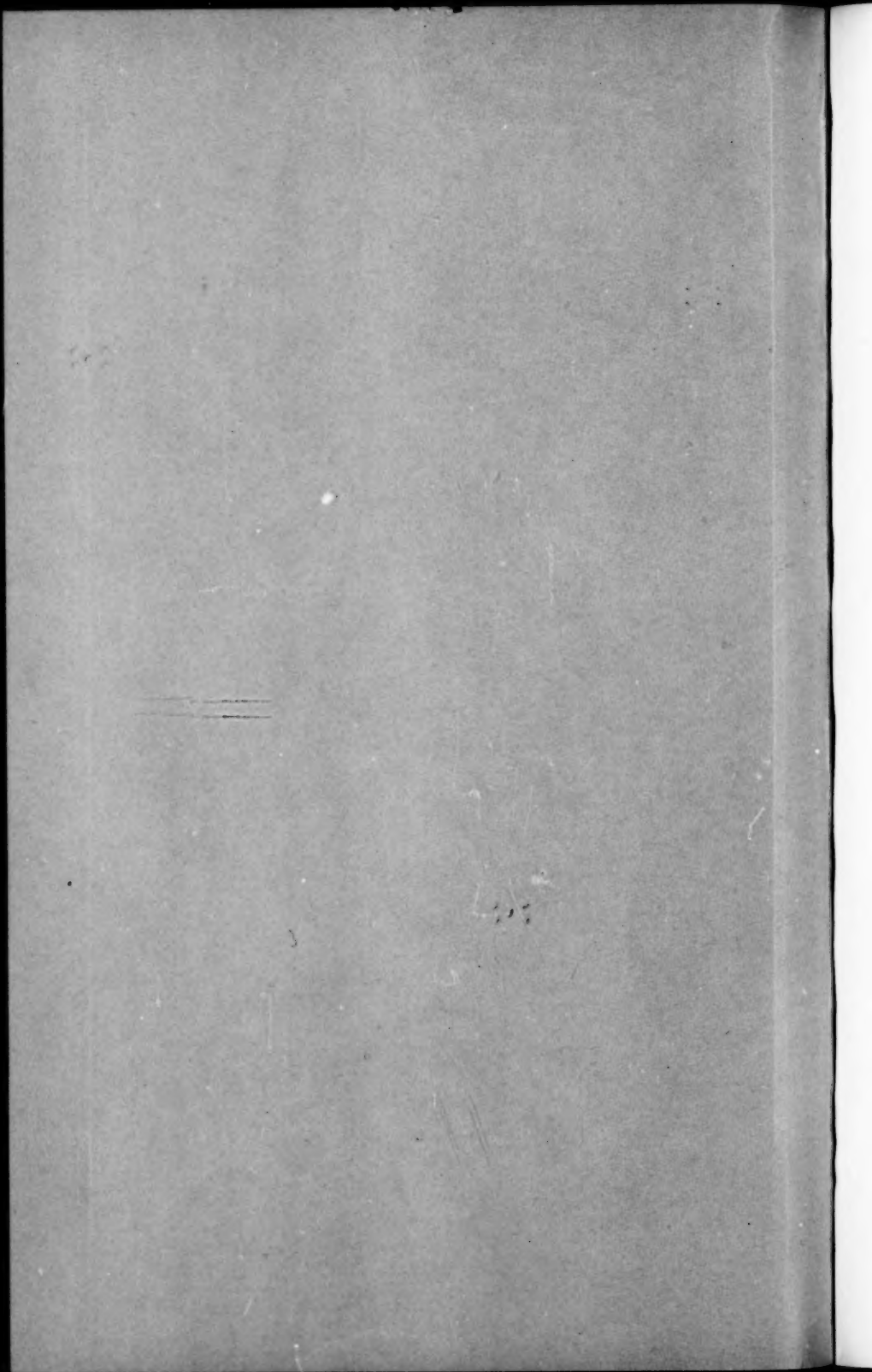
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**OHIO STATE
UNIVERSITY**

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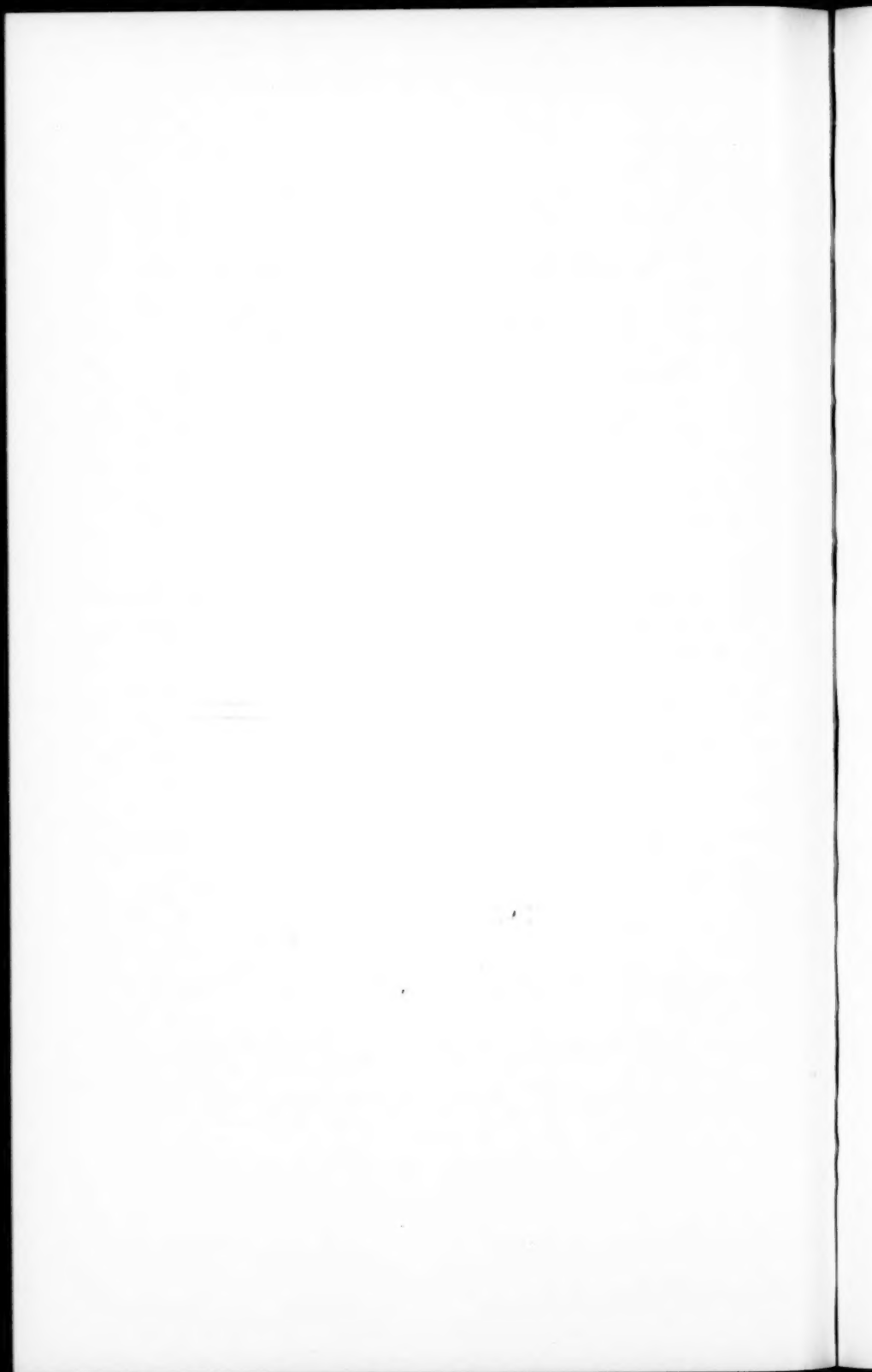
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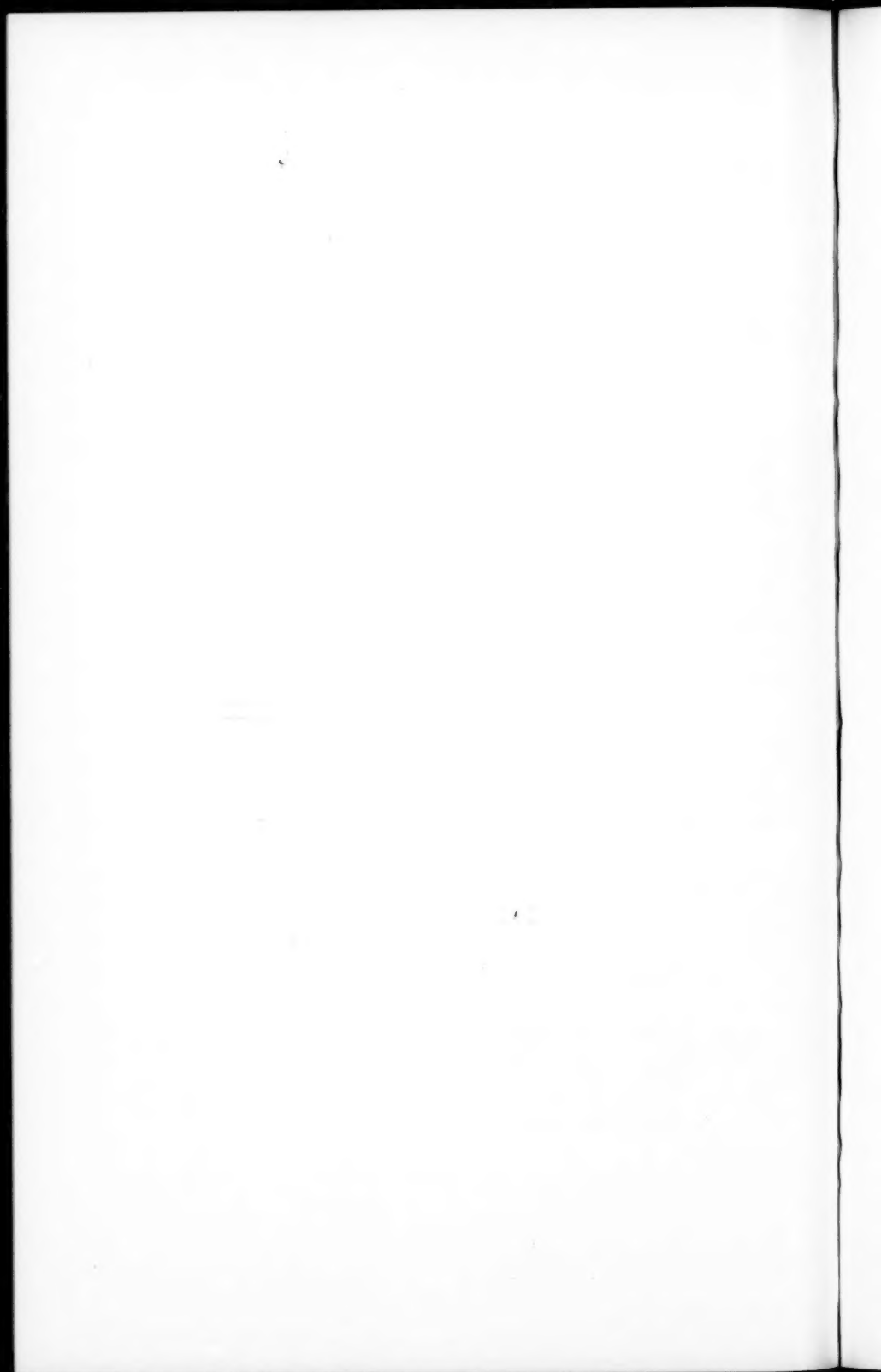
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Synopsis of Nearctic Ichneumoninae Stenopneusticae with Particular Reference to the Northeastern Region (Hymenoptera)

Part I¹

Introduction, Key to Nearctic Genera of Ichneumoninae Stenopneusticae, and Synopsis of the Protichneumonini North of Mexico

By GERD H. HEINRICH

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Introduction

The aim of this paper is to provide a taxonomic treatment of all species of the Ichneumoninae (Stenopneusticae) so far known from Canada south of 54°N. and east of Manitoba, and from the United States north of 42°N. and east of Michigan. In some genera and tribes, where more comprehensive treatment seemed feasible, all the species in North America north of Mexico are treated. In order to establish a trustworthy foundation, all available types of previously described species have been carefully examined. In particular the Canadian National Collection in Ottawa, the Provancher collection in Quebec, the Cresson collection in Philadelphia, the Townes collection in Ann Arbor, the Smithsonian collection in Washington, the Heinrich collection in Dryden, the Viereck types in New Haven and parts of the collection of the Museum of Comparative Zoology in Cambridge have been studied. All new species from northeastern North America in these collections will be described and included. The keys in this paper should render possible the identification of 50 to 70 percent of the forms occurring in the area treated. We should not expect more because the inventory of species is certainly not yet completed and the association of sexes is in many species still doubtful or based on mere hypothesis.

Acknowledgments

I have been greatly aided in my work by the kind assistance of curators of the collections mentioned above. I wish to express my thanks to them, in particular to Mr. Noel M. Comeau of the Provincial Museum of Quebec, to Miss Luella Walkley of the U. S. Department of Agriculture, to Mr. James A. G. Rehn and Mr. Harold S. Grant of the Academy of Natural Sciences in Philadelphia and to Mr. J. B. Kring of the Connecticut Agricultural Experimental Station in New Haven. I am especially bound in gratitude to my colleague and friend Dr. Henry Townes, who made his extremely rich private collection available for my studies and facilitated my work by his kind hospitality, and to Drs. W. R. M. Mason and L. K. Smith of the Entomology Research Institute in Ottawa, who took the trouble to read and linguistically improve my manuscript. The drawings were made by Mrs. M. Platek, Bio-Graphic Unit, Department of Agriculture, Ottawa, and I wish to express my appreciation of her skilful work. Last but not least I wish to thank the members of the Entomology Research Institute, Canada Department of Agriculture, who have initiated my work, facilitated it, and created its economic basis, and my wife who has assisted by preparing the original typescript of this work.

¹This paper will be published in separate, consecutively numbered parts as supplements to *The Canadian Entomologist*.

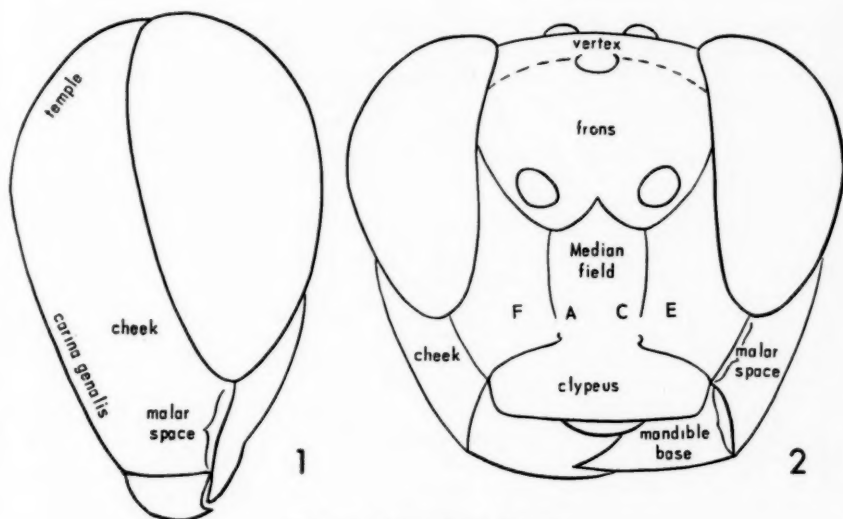
Review of Literature

I decided from the start not to give a complete list of references to each described species. References prior to 1943 may be found in Townes' 1945 catalogue (Mem. Am. Ent. Soc., vol. II), selected references prior to 1950 in Townes' 1951 catalogue (U. S. Dept. of Agriculture, Agriculture Monograph No. 2) and others in the first Supplement to the latter by Karl V. Krombein, 1958. References in this paper are confined to the original descriptions, and recent publications not mentioned in the catalogue quoted above. There exist only two recent revisional papers on parts of the North American Ichneumoninae; that on the tribe Trogini by H. Pearson Hopper (Trans. Am. Ent. Soc. 65: 307-346, 1939) and that on the genus *Hoplismenus* by Hewson H. Swift (Ann. Ent. Soc. Am. 39: 397-410, 1946). Both are careful studies which need little supplementing. They will be used with little modification in the respective groups in this paper.

Terminology

Antenna. —The first segment of the antenna, the *scape*, is of minor taxonomic value and will be mentioned only occasionally with reference to its color. Of greatest importance however, particularly for the specific distinction of the females, is the *flagellum*. Two main types of shape of the female flagellum are distinguished: the *bristleshaped* type, which tapers considerably toward the apex or is strongly attenuated at the end, and the *filiform* type with non-tapering, blunt apex. Intermediate forms occur and will be described as such. The term *bristleshaped* will be used for any flagellum with attenuated apex, regardless of whether the flagellum is slender or thick. The first joint of the flagellum is always the longest, the following segments usually being successively more and more abbreviated until a segment of equal length and width is reached. As the basal flagellar joints are usually not exactly cylindrical but slightly laterally compressed, the first square joint must always be seen from the side. In this paper the short description "*fifth segment square*" will mean that, seen from the side, the fifth joint of the flagellum (counting from the base) is the first which appears approximately as wide at the apex as long. Beyond the middle the flagellum in the females of most species is flattened on one side and more or less widened. The degree of dilatation is of taxonomic importance and will be described by giving the relation of the median length of the widest segment of the flagellum to its width. The description "*widest segment three times as wide as long*" means that seen from the flattened side, the widest of the flagellar segments is three times as wide, measured from one lateral edge of the flat part to the other, as medially long. The shape of the male flagellum shows less morphological variation than that of the female. Instead the male flagellum offers another character in the shape and number of the *tyloides*.

Head. —The orbit is a narrow stripe on the head adjacent to the eye and all around it. The orbit is divisible into several parts named according to their situation. *Frons* is a part of the head above the supra-antennal deepening and up to the lower ocellus including the level of the latter. By *vertex* I mean the top part of the head, adjacent to the frons and extending back to the edge of the posterior declivity, or occiput. *Temple* means the area between approximately the upper fifth of the hind margin of the eye and the *occipital carina*. *Malar space* will be used as a term for the shortest distance from the lower margin of the eye to the anterior (upper) corner of the mandible. It will be given in relation to the width of the mandible measured at its base. The *carina oralis* is situated on the posterior part of the head and borders the opening of the mouthparts. *Carina genalis* refers to the lower part of the occipital carina and borders



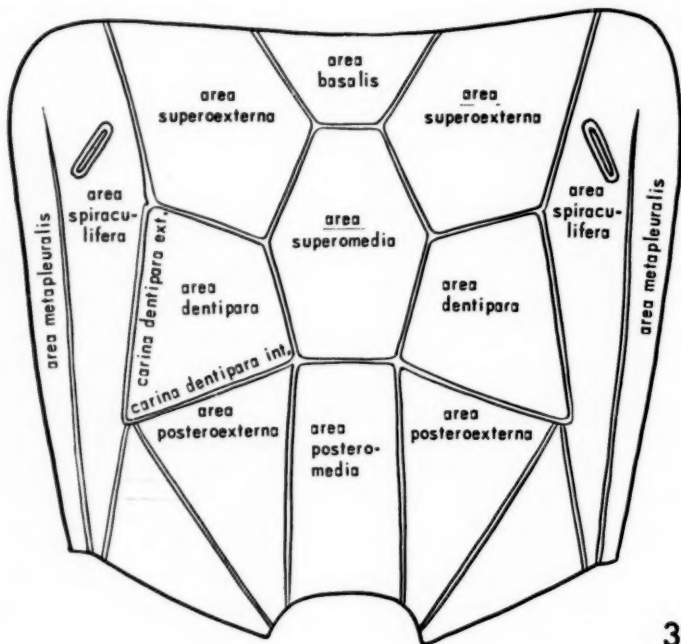
Figs. 1-2. Morphology of head.

the cheek area. *Cheek* means the region between the malar space and the carina genalis. *Cheek profile* means the outline of the cheeks seen in front view; *temple profile* the outline of the temples seen vertically from above. The carina genalis and carina oralis meet usually shortly above the hind (lower) corner of the mandible. The spot where both carinae join will be called the *carinal junction*, the carinal section between the junction and the mandible base is called the *abscissula*.

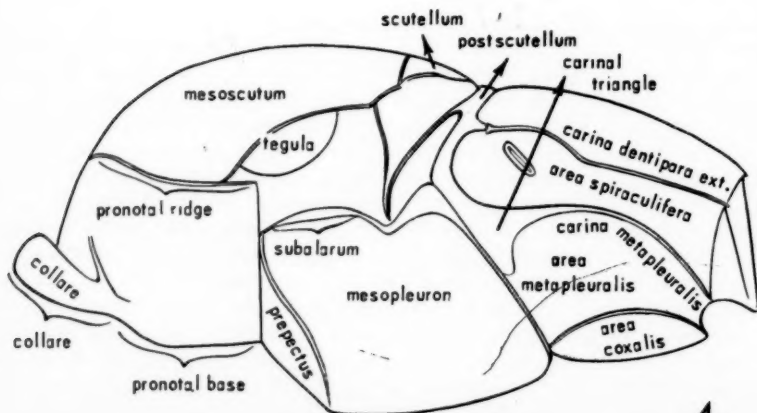
Thorax.—The *collare* is the elevated, collar-like, anterior, median part of the pronotum covering the soft tissue connecting head and thorax. The upper and lower border of the pronotum will frequently be mentioned as areas often bearing light color pattern. I refer to the upper margin of the pronotum as *pronotal ridge*, to the lower border of the pronotum as *pronotal base*. The longitudinal furrows of the mesoscutum will be termed as *notauli*. They are subobsolete in the Ichneumoninae and more or less distinctly indicated only at the base close to the anterior border of the mesoscutum. The notauli (or the lines where they would be if present) divide the mesoscutum in a *median*, and two *lateral lobes*. For the protruding ridge in the anterior part of the upper border of the mesopleuron which supports the base of the wings I use the name *subalarum*. *Mesosulcus*² is the median furrow of the mesosternum. The *sternauli* of the Ichneumoninae are not extended on the mesopleura as usual in the Cryptinae, but are often, however, basally impressed on the mesosternum. *Prosternum* is the plate beneath the pronotal base and covering the ventral side of the prothorax backwards to the front coxae. The smooth, vertical frontal plane of the mesothorax (behind the front coxae) is the *prepectus*. The propodeum is treated as a part of the thorax. Its upper surface including the *area basalis*, the *area superomedia*, the two *areae superoexternae* and the two *areae dentiparae* is termed the *horizontal part of the propodeum*. The horizontal part is bordered laterally by the *carinae dentiparae exteriores* and apically by the *carinae dentiparae interiores*. The lateral parts of the propodeum sloping down from the carinae dentiparae

²In this paper the terms *mesosulcus* and *mesolcus* are equal.

exteriores to the hind coxae are the *metapleura*. They are divided by the *carinae metapleurales* into the *area spiraculifera* bearing the spiracles of the propodeum above, and the large *area metapleuralis* below each carina metapleuralis. The area metapleuralis is usually separated from another small field above the hind coxa, the *area coxalis*. At the place where the carina metapleuralis meets the posterior border of the mesopleuron the carina is widened into a triangular



3



4

Figs. 3-4. 3, Morphology of propodeum; 4, Morphology of thorax.

shape, the *carinal triangle*. The *apical part of the propodeum* includes the *area posteromedia* in the middle and the two *areae posteroexternae* at the sides. Of taxonomic importance is the ratio of the length of the horizontal part of the propodeum to the length of its apical part. These two lengths are measured along the mid-dorsal line: the area basalis plus the area superomedia for the horizontal part: the area posteromedia for the apical part.

Abdomen.—The dorsal segments of the abdomen, the visible tergites one to seven, are designated by arabic numbers. The narrow basal part of tergite one is the *petiolus*, the widened apical part the *postpetiolus*. The median part of the postpetiolus is often somewhat raised and laterally bordered by sharp edges, thus forming a distinct *median field*, the sculpture of which is usually different from the sculpture of the two *lateral fields*. The sculpture of the median field has taxonomic significance and may be longitudinally *striated*, irregularly *reticulated*, *punctured*, or *smooth*. The deepening at both sides of the base of tergite two are the *gastrocoeli*. The transverse, smooth, declivities sloping down from the hind margin of the gastrocoeli towards the deepening are called *thyridia*. The thyridia may be absent where the gastrocoeli are distinctly deepened (e.g., *Ctenichneumon* Thoms.) or present as a narrow, translucent, transverse, band in cases where the gastrocoeli are obsolete. The ventral segments of the abdomen are the *sternites*. The last sternite, the *hypopygium*, shows considerable variation in length in the females, and in shape and length in the males. If a female hypopygium is prolonged so that it covers the entire, or nearly the entire, slit for the ovipositor, the abdomen is called *amblypygous*, if not, *oxy-pygous*.

Wings.—In the Ichneumoninae characters of wing venation show very little specific variation. They are not used at all in this paper.

Legs.—The three pairs of legs, or their parts will be referred to by roman numbers: I, stands for the anterior; II, for the middle; III, for the posterior, pair of legs. The tarsal segments are designated by arabic numbers. The first tarsal segment is the *metatarsus*. The second, short, segment of the trochanter is called the *trochantellus*. The third coxae of the female sometimes bear a ventral brush-like patch of dense hair, the *scopa* or *scopula*.

Abbreviations

For quotations of literature, the customary abbreviations will be used. The names of collections studied will be abbreviated as follows:

- CNC — Canadian National Collection, Ottawa, Ontario.
- USNM — United States National Museum, Washington, D. C.
- ANS — Academy of National Science, Philadelphia, Pa.
- MCZ — Museum of Comparative Zoology, Cambridge, Mass.
- CHT — Collection Henry Townes, Ann Arbor, Mich.
- CGH — Collection Gerd Heinrich, Dryden, Maine.

Sexual Dimorphism

In the Ichneumoninae the differences between the sexes are extraordinarily great in morphology as well as in coloration. The structural sexual dimorphism shows nearly the same pattern and degree in almost all groups of the subfamily. The differences in color, however, are considerably more strongly developed in some groups than in others. The tribes Trogini and Protichneumonini show relatively great coloristic resemblance between the sexes. Also in the Platylabini and the Listrodromini the color of males and females is not very much differentiated. In most of the genera of the Ichneumonini, however, especially in *Ichneumon* L., *Cratichneumon* Thoms., *Spilichneumon* Thoms., *Pseudambly-*

teles Ashm., and some species of *Ctenichneumon* Thoms., the sexes are strikingly different in color. In this group females and males of the same species often have no similarity at all, while the same sex in different species shows nearly uniform color pattern. As far as morphology is concerned the females offer more and better diagnostic characters than the males. The females show a rather high degree of specific differentiation of the flagellum, of the shape of the head, of the coxae III (presence or absence of the scopa) and of the shape of the propodeum. But all these features represent adaptive characters which are not shared by the males. In general there is only one diagnostic character common to both sexes, the structure of the gastrocoeli. Often, however, distinctly developed specialisations of the female head, mandibles, or propodeum, are at least slightly indicated in the corresponding part of the male also. Such faint "convergences", giving only a hint of the association of sexes, are often hardly recognizable. Under such circumstances it is sometimes impossible to achieve a correct association and many associations have to be considered hypothetical until confirmed by biological facts such as rearings of both sexes from the same host or observations of copulation.

Biological Notes

The Ichneumoninae are without exception parasites of Lepidoptera. Throughout the whole subfamily a rather constant relationship is evident between the single parasite species and its host species as well as between whole phylogenetic groups of parasites and corresponding phylogenetic groups of host species. For example, *Callajoppa exaltatoria* Panz. (an Old World species) is a monophagous parasite of the sphingid *Sphinx ligustri* L. and all other Trogini of the *Callajoppa* group are also parasites of Sphingidae. The *Trogus* group of the tribe Trogini parasitizes different species of the genus *Papilio*. The tribe Listrodromini lives on Lycaenidae. All Platylabini are parasites of Geometridae, with a single known exception: the European *Platylabus tenuicornis* Grav. normally parasitizes *Drepana curvatula* Bkh.—seemingly a taxonomic mistake sometimes shared by inexperienced entomologists. The species of *Hoplismenus* are parasites of Nymphalidae and Satyridae. So are the genus *Thyrateles* and the *gracilicornis* group of the genus *Ichneumon*. The bulk of the species of the latter genus are parasitic on Noctuidae. The tribe Protichneumonini refuses Rhopalocera, but has within the Heterocera adapted to host-species of very different phylogenetic position, e.g. Sphingidae, Lymantriidae, Notodontidae, Noctuidae, and Geometridae.

Some species of the Ichneumoninae are strictly monophagous, the remainder are at least restricted in their host choice to a small number of closely related hosts. This, however, does not exclude that exceptionally, and in emergency, a rather different host can be successfully parasitized. It is one of the numerous defects of the customary compilations of host records that they do not distinguish between "typical host" and "emergency host".

Most of the Ichneumoninae parasitize the host larva. This is proven for the Trogini, the Platylabini, the genera *Amblyjoppa*, *Goedartia*, *Acolobus*, several species of *Pseudamblyteles* etc. Formerly it was generally assumed that all Ichneumoninae deposited their eggs into the larvae. The first differing record concerned *Cratichneumon nigritarius* F., the parasite of the European pine-looper, which was found to parasitize the fresh pupa of the host. Recently Rolf Hinz proved for the first time that species of *Ichneumon* do the same. If we look over all the records mentioned above it seems amblypygous females deposit the egg into the larvae, oxygygous into the pupa, of the host. Whether

this is indeed a general rule without exception still needs to be investigated. I have some doubt about the Protichneumonini, most of which are strongly oxy-pygous but have been reared frequently enough from collected host material, whether caterpillars or pupae, I do not know.

Evidently different phylogenetic groups of parasites attack the larvae in different stages of development. Rolf Hinz observed that the females of *Limerodops* use their highly specialized, elongate abdomen for depositing the eggs into the earliest larval stages of a moth caterpillar hidden in their protective webs in the inflorescences of certain grasses. It may be suspected that the similarly specialized abdomen of other species and genera such as *Limerodes* and *Ectopimorpha* represents an adaptation for a corresponding purpose. But I doubt that the parasitization of such early larval stages of the host is the general rule for amblypygous females. Twice I have observed *Platylabus* females depositing their eggs into evidently nearly full-grown looper larvae.

All species of the genera *Ichneumon*, *Thyrateles*, *Exephanes*, *Stenichneumon*, *Aoplus*, *Chasmias*, *Spilichneumon*, *Eutanyacra*, *Hoplismenus*, and at least a part of the species of *Pseudamblyteles* hibernate as adult females. The tribes Trogini, Protichneumonini, Platylabini, Listrodromini and the genera *Cratichneumon* and *Ctenichneumon* do not hibernate as adults. As in the genera *Vespula* and *Bombus* only the fertilized female hibernates, whereas the male dies in the late fall. In the spring, usually at the beginning of May, the hibernated females begin to leave their hiding places in rotten stumps and logs, under bark, under moss-carpeted or between rocks and the like in order to start their search for the hosts. Some species leave the hibernating quarters early, others delay some time under cover in spite of rising temperature. The hunt for the needed host and the deposition of all eggs evidently takes a rather long time, as hibernated females, for example of *Ichneumon annulatorius* Fabr. or *Ichneumon laetus* Br., can still be found flying around at the beginning of June, when their own offspring, the males of the new generation, have already appeared.

It seems that all hibernating species produce only one generation a year, but this lacks confirmation. The life cycle of nonhibernating species seems sometimes to include two generations. For example, both sexes of some *Cratichneumon* and *Ctenichneumon* species are found during the spring as well as in the fall. The similarly nonhibernating Trogini and *Protichneumon* species certainly produce only one generation per year. This is probably true for all of the Protichneumonini, but the records are not complete enough to establish a general rule.

Nomenclature

I do not follow Townes (1951, Hymenoptera North of Mexico, Catalogue) in a few generic names because I acknowledge the decisions of the International Commission on Zoological Nomenclature which has ruled the names *Ichneumon*, *Pimpla*, *Epialtes*, and *Cryptus* to be nomina conservanda. Consequently in this paper I use *Coelichneumon* Thoms. instead of *Ichneumon* (sensu Townes) and *Ichneumon* L. instead of *Pterocormus* (sensu Townes) in accordance with the First Supplement of the catalogue mentioned above, published 1958.

General Remarks

The extraordinarily pronounced sexual dimorphism of the Ichneumoninae, coupled, in many cases, with a high degree of individual variability, and on the other hand, the comparatively small interspecific differentiation in morphology and color in great numbers of related species, render the taxonomic arrangement

of the subfamily and the identification of many species extremely difficult. Until now it has been practically impossible to identify a North American ichneumonine except by direct comparison with the type. I hope that my paper will somewhat improve the situation, but I wish to make it clear that our present, still very defective, state of knowledge has not permitted me to achieve more than the creation of a new stepping-stone to more advanced work. There is no doubt that we do not yet know all the species occurring in the Northeast and we also do not yet know the correct association of many males and females which may still be listed under different names or found to be incorrectly associated. Before all these gaps are filled no key will be complete and likely to work with perfection. So all I can do is open the gates. Behind them lies a wide-open field still waiting for further research. Scores of years will be necessary to complete it.

If the name of a collection in the following text is added in parenthesis to a host record or to a new record of distribution, this means that the specimen on which such a record is based is to be found in the mentioned collection.

Key to the Genera of the Ichneumoninae Stenopneusticae of America North of Mexico

The key below is tailored to the North American fauna only. This means that where species of certain genera show different characters in other parts of the world, only the Nearctic species were considered. Therefore this key is not fully applicable to regions outside North America.

1. Propodeum compressed longitudinally and shortened in such a way that the area superomedia is reduced usually to a small, raised and smooth boss (Figs. 5 and 10) from which the propodeum slopes steeply down to the front as well as backwards. (Tribe Trogini) 2
- Propodeum normal, sometimes shortened but never sloping down simultaneously towards the front and the apex; area superomedia almost without exception well defined by surrounding carinae. 9
2. Tergites 1-5 or 1-6 extraordinarily strongly chitinized and with extremely strong and dense striated and reticulated sculpture covering the entire surface, flattened above and somewhat constricted at the base; cheek profile long and narrowed. (*Trogus* group) 3
- All tergites normally and evenly chitinized, without striation and reticulation, rather finely punctured or alutaceous, neither flattened above nor constricted at the base; cheek profile short and rather wide. (*Callajoppa* group) 4
3. Frons with a pair of acute or subacute horns below the ocelli; female flagellum bristle-shaped, not widened and not flattened beneath beyond the middle; apex of female abdomen amblypygous. (Female tergites 1-5, male tergites 1-6 strongly chitinized and sculptured.) *Trogus* Panzer
- Frons without distinct horns; female flagellum distinctly widened beyond the middle and flattened beneath; apex of female abdomen oxygygous. *Macrojoppa* Kriechbaumer
4. Postpetiolus with a conical elevation at its base. 5
- Postpetiolus without conical elevation at its base. 6
5. Scutellum nearly conical, ascending gradually from the basal furrow towards the apex and then sloping down abruptly; apical margin of clypeus very slightly emarginate. (Female flagellum with distinct whitish annulus. Tergites 1-3 red, 2-7 deep black.) *Tmetogaster* Hopper
- Scutellum not ascending from the base toward the end; apical margin of clypeus not at all emarginate. *Conocalama* Hopper
6. Apical margin of clypeus strongly emarginate. (Posterior slope of the propodeum less steep than in the other genera of the tribe except *Catadelphus*; scutellum conical.) *Gnamptopelta* Hopper
- Apical margin of clypeus straight. 7

7. Upper surface of scutellum simply convex; posterior slope of the propodeum rather gradual; a small area superomedia surrounded by carinae is present. *Caedelpbus* Wesmael
Upper surface of scutellum ascending to a conical shape; propodeum sloping down steeply and abruptly; area superomedia usually replaced by a shiny boss. 8
8. Scutellum conically elevated into a point; apical margin of clypeus slightly projecting in the middle, its sides parallel. *Callajoppa* Cameron
Scutellum ascending from the basal furrow in a flat area with sharp lateral edges, its elevated apex not pointed but slightly truncated; apical margin of clypeus straight, its sides converging. *Tricyphus* Kriechbaumer
9. Face and clypeus without plastic features, in other words without noticeable elevations or deepenings, forming one combined homogeneous plane which is imperceptibly transitional at the sides to the rounding of the cheeks, and/or collare as in first part of couplet 10; foveae of the clypeus very small or obsolete. (Mandibles stout and short with a pronounced gap between the teeth; scutellum considerably elevated above the postscutellum; postpetiolus with scattered punctures or partially smooth, not longitudinally striated; propodeum short; small species of 6-10 mm. length.) (Tribe *Listrodromini*) 10
Face and clypeus with more or less distinct "plastic" features, as for example a separating suture or a somewhat convex median field of the face or at least a demarcation between cheeks and face indicated by a longitudinal slight deepening of the malar space or a lateral slightly elevated edge of the face; collare not as in first part of couplet 10; clypeal foveae distinct. 11
10. Transverse furrow of the pronotum behind the collare interrupted in the middle by a longitudinal protuberance; clypeal foveae small; claws not pectinate. (Abdomen red or black or both, with white anal pattern; mesoscutum always black.) *Anisobas* Wesmael
Transverse furrow of pronotum not interrupted medially; female claws pectinate; clypeal foveae obsolete. (Abdomen black with white anal marks and white side marks of the anterior tergites; female mesoscutum red). *Neotypus* Foerster
11. Clypeus distinctly convex, its apical margin straight and normally thick. (Scutellum more or less elevated, often laterally carinated.) 12
Clypeus flat, if somewhat convex at the base, then its apical margin arched or unusually thinned. 24
12. Petiolus flattened, wider than high; male flagellum often without tyloides. (Mainly small, graceful species; female flagellum bristleshaped, long and slender; female abdomen rather short oval, amblypygous.) (Tribe *Platylabini*) 13
Petiolus not wider than high; male flagellum always with tyloides. 20
13. Gastrocoeli pronounced, usually transverse. 14
Gastrocoeli obsolete or subobsolete. 19
14. Spiracles of the propodeum circular or almost so. (Gastrocoeli transverse, each wider than the interval between them; propodeum short, area superomedia transverse; small species 6-10 mm. long.) *Cyclolabus* Heinrich
Spiracles of the propodeum longish-oval or linear. 15
15. Propodeum without distinct apophyses, although sometimes with short, tooth-like projections. 16
Propodeum with strong and long apophyses. 18
16. Gastrocoeli deep, in nearly all species transverse with each wider than the interval between them; clypeus rather strongly convex; costulae absent, rarely indicated. (Male flagellum without tyloides.) *Platylabus* Wesmael
Gastrocoeli less deepened, not transverse and not wider than their interval; clypeus little convex or almost flat; areolation complete, costulae strong. (Male flagellum sometimes with a short row of tyloides beyond the twelfth segment.) 17
17. Male flagellum with a unique structure of the segments at and beyond the middle, which are deeply and broadly incised at their apices, forming a long row of long, sawlike teeth. (♀♀ cannot be distinguished.) *Pristiceros* Gravenhorst
(Not recorded from the Nearctic)
Male flagellum without such structure. *Neopristiceros*, new genus
(Type-species: *Ichneumon lascivus* Cresson)

18. Gastrocoeli deep, narrow, transverse, extremely wide transversely and separated only by a very narrow interval; area superomedia surrounded by high carinae, approximately hexagonal, narrowed anteriorly; apophyses long, curved upwards. *Tropicolabus* Heinrich^{*}
 Gastrocoeli rather shallow and not transverse, their outline approximately quadrangular, transverse'y distinctly narrower than their interval; areae basalis and superomedia not separated, forming a confluent middle-area with straight lateral carinae converging apically. *Ambloplitis* Heinrich
19. Spiracles of the propodeum longish-oval or linear as in *Platylabus*; propodeum rather long, the area superomedia square or somewhat longer than wide; costulae wanting. *Asthenolabus* Heinrich
 Spiracles of the propodeum small, short-oval or circular; propodeum short, the area superomedia transverse; costulae strong. *Linytus* Cameron
20. Spiracles of the propodeum very small and circular. (Postpetiolus punctured; propodeum strongly and completely areolated and strongly reticulated, with small apophyses; apex of female abdomen somewhat truncate; small species about 7 mm. long.) *Apaeleticus* Wesmael
 Spiracles of the propodeum elongate. 21
21. Propodeum without apophyses. 22
 Propodeum with long apophyses or at least with short toothlike prominences. 23
22. Female abdomen extremely slender, its apex amblypygous with prolonged hypopygium surpassing the last tergite; gastrocoeli obsolete, thyridia however very large, transverse and oblique, somewhat removed from the base of the second tergite; scutellum elevated, truncate, laterally not carinate, its apical slope gradually widening from the top to the bottom; tarsi III with white pattern in both sexes, male face and clypeus white. (Small species about 10 mm. long.) *Hypomecus* Wesmael
 Female abdomen normal, its apex oxygygous; gastrocoeli more or less pronounced, sometimes transverse; scutellum more or less raised above postscutellum, usually laterally partially or entirely carinate; tarsi III never white marked; males usually with white pattern on the orbits of the face, on the clypeus and the temples. (Clypeus but slightly convex; small species 7-11 mm. long.) *Platylabops* Heinrich
23. Propodeum with strong apophyses; apex of female abdomen sharply oxygygous. (Scutellum highly elevated; ovipositor usually projecting.) *Hoplismenus* Gravenhorst
 Propodeum with short prominences; apex of female abdomen amblypygous. *Hybophorellus* Schu'z
24. Horizontal part of the propodeum without areolation; postpetiolus with a hump medially at the base. (Spiracles of the propodeum short and wide; sternites strongly chitinized, usually without plica; apex of female abdomen amblypygous.) *Probolus* Wesmael
 Areolation of the propodeum distinct or else postpetiolus without hump at the base. 25
25. Propodeum with apophyses. 26
 Propodeum without apophyses. 30
26. Mandibles seemingly normal but distinguished by a third tooth which is hidden on their inner side and rather far removed from the two apical teeth. (Basal suture of clypeus arched; apical margin of clypeus strongly bisinuate, thinned and protruding in the middle; propodeum, area superomedia and apophyses elongate.) *Lobaegis* Townes
 Mandibles without third tooth. 27
27. Mandibles sickleshaped, either unidentate or with the subapical tooth moved to the inner side of the mandible. 28
 Mandibles normal and bidentate. 29
28. Mandibles unidentate; apex of female abdomen amblypygous, the three last tergites broadly excavated at the hind margin, which is membranous in the middle. *Plagiotrypes* Ashmead

^{*}See Heinrich, 1959, Entom. News 70: 216.

- Subapical tooth present; apex of female abdomen oxygygous, the last tergites normal, ovipositor strongly projecting. (Sides of clypeus elevated and strongly converging, its apical margin slightly excavated and medially projecting; pronotal ridge widened.) *Nartbecura* Townes
29. Gastrocoeli obsolete; area superomedia an elongated hexagon; apophyses small and narrow. (Male abdomen slender, somewhat tapering toward the base but not toward the apex; tergites rather strongly punctured; color mainly ferruginous; smaller species 7-11 mm. long.) *Rubicundiella*, new genus
(Type-species: *Ichneumon mucronatus* Provancher)
- Gastrocoeli pronounced; area superomedia not prolonged and not hexagonal; apophyses strong and wide. (Male abdomen of normal shape, tapering toward the apex; color mainly ferruginous; agrees with *Hoplismenus* except for the flat clypeus.) *Hemihoplis*, new genus
(Type-species: *Hoplismenus teres* Swift)
30. Mandibles sickleshaped, the subapical tooth situated at their inner side; clypeus with thinned apical margin, somewhat convex at its base. (Gastrocoeli transverse with narrow interval; ovipositor projecting; female flagellum bristleshaped, long and slender; graceful species 9-10 mm. long with white anal spots.) *Pseudoplatylabus* Smits van Burgst
- Mandibles not sickleshaped, subapical tooth on level with the upper tooth or almost so; clypeus normal. 31
31. Areae dentiparae slanting down backwards in a curved slope close to the base of the coxae III; the carinae dentiparae externae seen from the side in their apical part running parallel or even converging with the carinae metapleurales; apex of the areae dentiparae never forming a sharply prominent corner (Figs. 6, 8, 9). (Gastrocoeli usually large and deep; median field of the postpetiolus usually striate or longitudinally reticulated, sometimes punctate; areolation complete, except in *Coelichneumonops*, area superomedia semi-oval or horseshoe-shaped, sometimes hexagonal; apex of female abdomen strongly oxygygous, except in *Amblyjoppa*; color of abdomen red, black or blue, always without white anal pattern; handsome species 10-25 mm. long.) (Tribe Protichneumonini) 32
- Areae dentiparae not or hardly curved down backwards; the carinae dentiparae externae in their apical part not converging toward, but diverging from, the carina metapleurales, thus forming a sharp angle with the outer carina of the areae posteroexternae (Fig. 7). (Tribe Ichneumonini) 36
32. Apex of female abdomen amblypygous. (Only the male of one species known in North America, which is more than 20 mm. long, and black with tergites 2-3 pale ferruginous.) *Amblyjoppa* Cameron
- Apex of female abdomen oxygygous. 33
33. The anterior, narrowed, part of the area superomedia somewhat raised above the level of the horizontal part of the propodeum so that the surface of the adjacent areae superoexternae slopes distinctly down from the border of the area superomedia towards the sides and towards the front of the propodeum. (Large species above 20 mm. long; in all nearctic species tergites 2-7 red.) *Protichneumon* Thomson
- Area superomedia level with the areae superoexternae. 34
34. Area superomedia large, expanded horseshoe-shaped or even half-moon-shaped; areae dentiparae hardly slanting at all; carinae dentiparae exteriores somewhat diverging from the areae metapleurales (Figs. 7 and 24). (Gastrocoeli very large and deep with narrow interval; black with yellow pattern on the pleura, tibiae, tarsi and postpetiolus.) *Orgichneumon*, new genus
(Type-species: *Ichneumon calceatorius* Thunberg)
- Area superomedia smaller, not, or little wider than long; areae dentiparae distinctly sloping down backwards. 35
35. Areolation of the propodeum distinct and complete, costulae present; areae dentiparae sloping down in a more or less distinct curve; gastrocoeli large and deep; median field of the postpetiolus with strong sculpture. *Coelichneumon* Thomson
- Areolation of the propodeum weak and defective, at least the costulae wanting, sometimes also the area superomedia; areae dentiparae slanting down more gradually in an oblique plane; gastrocoeli small and little deepened (Figs. 8 and 23); median field of postpetiolus weakly sculptured or almost smooth. *Coelichneumonops* Heinrich

36. Mandibles short and wide with strong, almost equal apical teeth which are separated by a wide and deep gap. (Anterior tergites grossly punctured, strongly chitinated and a little constricted at their base; apex of female abdomen oxypygous; wings with dark bands or evenly infuscated; main color of body and legs ferruginous.) *Trogomorpha* Ashmead
- Mandibles of different shape. 37
37. Gastrocoeli each wider than their interval. 38
- Gastrocoeli not wider than their interval. 45
38. Median field of postpetiolus distinctly longitudinally striate or reticulate; gastrocoeli large and deep. 39
- Median field of postpetiolus finely coriaceous, alutaceous, smooth, or punctate; gastrocoeli usually shallow, sometimes indistinct.
39. Claws strongly and densely pectinate, the whole length from the base to the beginning of the apical curve. (Apex of female abdomen amblypygous.) 39a
- Claws not pectinate or at most with some indistinct pectination at their base. 40
- 39a. Propodeum with short apophyses; flagellum of male with a row of more than ten large, oval tyloides; tergites 6 and 7 of female somewhat elongate, giving apex of abdomen a slightly tapering appearance. *Pseudoamblyteles* Heinrich
- No indication of apophyses; flagellum of male without distinct, clearly-defined tyloides; tergites 6 and 7 of female abbreviated, giving apex of abdomen a very blunt appearance (as in *Platylabus*) *Patroclus* Cresson (neotropical)
40. Apex of female abdomen amblypygous. (Males go to 41.) *Patroclides*, new genus (Type-species: *Amblyteles perluctuosus* Provancher)
- Apex of female abdomen strongly oxypygous. 41
41. Area superomedia expanded, horseshoe-shaped or half-moon-shaped; costulae distinct. 34
- Area superomedia square or rectangular; usually no costulae. 42
42. Gastrocoeli extremely large, deep and wide; thyridia pronounced, wide and oblique; female abdomen elongate, second tergite considerably longer than apically wide; area superomedia large, square; no costulae. (Postpetiolus sometimes with a hump medially at the base; large species 16-20 mm. long.) *Stenichneumon* Thomson also ♂♂ of *Patroclides*, new genus
- Gastrocoeli a little less deep and wide; thyridia a little less oblique; female abdomen stouter, the second segment not or hardly longer than apically wide, area superomedia smaller, sometimes square, sometimes longer than wide; costulae sometimes present. (Postpetiolus never with a hump at the elbow; in average smaller species 12-16 mm. long.) *Ichneumon* Linnaeus partim (*gracilicornis* group¹) and *Thyrateles* Perkins
43. Postpetiolus and the anterior tergites strongly punctate, smooth and shiny between punctures; carination of propodeum strong and complete; costulae always distinct; area superomedia half elliptic, sometimes elongated. (Female abdomen usually with white anal marks; female flagellum slender and bristleshaped in the type of the genus.) *Stenobarichneumon*, new genus (Type-species: *Ichneumon citator* Thunberg)
- Postpetiolus and the anterior tergites not strongly punctate, the postpetiolus finely coriaceous or almost smooth; carination of the propodeum sometimes weak, costulae sometimes wanting; area superomedia approximately quadrangular or hexagonal. 44
44. Mesoscutum, propodeum and postpetiolus finely coriaceous or rugulose (not shiny), nearly opaque; carination of the propodeum rather weak; area superomedia approximately square; costulae absent or weak. (Female flagellum bristleshaped, slender, except in a few species, which are distinguished from the others by the presence of anal spots.) *Aoplus* Tischbein

¹The *gracilicornis* group of *Ichneumon* shows little distinction from *Stenichneumon*. Both are however biologically well differentiated as the *Stenichneumon* species are parasites of the genera *Plusia* and *Autographa* while the *gracilicornis* group feeds on *Rhopalocera*.

At least the mesoscutum and propodeum distinctly shiny; areolation pronounced, costulae strong; area superomedia of the hexagonal type, narrowed anteriorly. (Female flagellum filiform; anal spots never present; small species.)

Homotherus Foerster⁵

45. Postpetiolus distinctly, sometimes grossly punctured. 46
Postpetiolus otherwise sculptured. 53
46. Scutellum highly elevated above the postscutellum; area superomedia large, its sides converging somewhat towards the apex and bulging a little anteriorly, costulae absent; postpetiolus and anterior tergites finely and very densely punctured, opaque; handsome species about 20 mm. long. (Apex of female abdomen amblypygous; color entirely bluish-black in the female, with yellow pattern on the legs and anterior tergites of the male, wings infuscated.) *Protopelmus* Heinrich
- Scutellum not highly elevated; area superomedia otherwise shaped; anterior tergites less densely punctured, not opaque; smaller species. 47
47. Female abdomen rather slender, amblypygous; area superomedia pointed arched-shaped; male hypopygium abbreviated, its middle part strongly convex and triangularly projecting a little. (Female flagellum bristleshaped and slender; male flagellum without tyloides; sides of clypeus converging; occiput strongly excavated.) *Tricobolus* Thomson
- Apex of female abdomen oxyptygous; area superomedia otherwise shaped; male hypopygium normal, not as described above. 48
48. Abdomen parallel-sided, slender, second tergite elongated; thorax and anterior tergites densely and grossly punctured; wings strongly infuscated. (Carination of propodeum strong and complete, area superomedia horseshoe-shaped, the costulae inserted in its anterior part; femora and abdomen vivid red.) *Limonethe* Townes
- Abdomen normally shaped; punctation of thorax and anterior tergites less dense and gross; wings not infuscated. 49
49. Ovipositor strongly projecting about half the length of the abdomen. (♂♂ go to 50.) *Aculichneumon*
(*Cryptefigies*), new subgenus
(Type-species: *Ichneumon confusus* Ashmead)
- Ovipositor of normal length. (Carination always complete with strong costulae, the area superomedia half oval or hexagonal.) 50
50. Female flagellum lanceolate: strongly widened and flattened beyond the middle, the apex sharply attenuated; area superomedia semi-oval, narrowed anteriorly, a little longer than wide; postpetiolus densely punctured all over, the median field obsolete or little pronounced. 51
- Female flagellum filiform or subfiliform, sometimes also attenuated, but not lanceolate; area superomedia hexagonal in various shapes, sometimes longer than wide; postpetiolus often with clearly defined median field. 52
51. Face and clypeus normal. (In the type of the genus and some closely related species light spots on the sides of the anterior tergites present, anal spots present or absent.) *Melanichneumon*
(*Melanichneumon*) Thomson
- Face and clypeus abnormally widened, the latter extremely short, about six times as wide as long. (No light pattern on the abdomen.) *Melanichneumon* Thomson
(*Rictichneumon*), new subgenus
(Type-species: *Ichneumon residuus* Cresson)
52. Female flagellum filiform and short; propodeum short, area superomedia hexagonal, not longer than wide; femora extremely short and thick; postpetiolus densely punctured all over, median field not defined. *Melanichneumon*
(*Barichneumon*) Thomson
- Female flagellum elongated, filiform to bristleshaped; propodeum less abbreviated, the area superomedia usually longer than wide, approximately hexagonal, narrowed anteriorly; femora not extremely short; median field of postpetiolus clearly defined, punctured or sometimes irregularly longitudinally striated, rarely almost smooth. *Melanichneumon*
(*Vulgichneumon*), new subgenus
(Type-Species: *Ichneumon brevicinctus* Say)
also some males of *Aculichneumon*

⁵According to a statement of Perkins, Foerster's *Homotherus* refers to the *locutor* group which was not separated from *Cratichneumon* Thomson until now. As this group is also represented in North America by a few species it seems to be appropriate to introduce Foerster's genus *Homotherus*, for which the species *Ichneumon locutor* Thunberg according to Perkins is the type.

53. Median field of postpetiolus longitudinally striate. 54
 Median field of postpetiole not distinctly and regularly longitudinally striate; instead
 alutaceous, coriaceous or smooth, sometimes with a few scattered punctures or
 with almost obsolete striation, occasionally with other sculpture. 70
54. Females. 55
 Males. 63
55. Apex of abdomen oxypygous. (Thyridia distinct; flagellum filiform or bristle-
 shaped) 56
 Apex of abdomen amblypygous. (Thyridia sometimes obsolete; flagellum always
 bristleshaped.) 58
56. Anterior border of clypeus slightly emarginate or bisinuate, strongly punctured.
 (Area superomedia longer than wide, rectangular; abdomen longish; almost en-
 tirely black species with one white anal spot and strongly infuscated wings.)
Chasmodon Ashmead 57
57. Area superomedia quadrangular; costulae in most of the species absent.
Ichneumon Linnaeus 52
 Area superomedia semi-elliptic or hexagonal, narrowed anteriorly, costulae very
 distinct. 52
58. Gastrocoeli large and deep; scutellum strongly elevated above postscutellum.
 (Thyridia pronounced, large; flagellum slender, not widened; area superomedia
 somewhat transverse.) *Thyrates* Perkins 59
 Gastrocoeli small and shallow; scutellum slightly, or not at all, elevated.
59. Hypopygium with a bunch of stiff bristles at its apex; propodeum rather short, the
 area superomedia more or less transverse, i.e. wider than long. (Upper mandible
 tooth in nearly all the American species more or less blunt; flagellum long and
 slender; abdomen short-oval.) *Eutanyacra* Cameron 60
 Hypopygium without bristles or with more evenly distributed bristles; propodeum
 less abbreviated, area superomedia square or longer than wide. 60
60. Mandibles strong and wide, often with blunt apex, sometimes shovel-shaped; thy-
 ridia distinct (except in species with obsolete gastrocoeli); flagellum stout with
 short basal joints; apical part of abdomen smooth and shiny. (In the type of the
 genus and in closely related species the area superomedia longer than wide, in
 several American species placed in this genus about as wide as long.)
Spilichneumon Thomson 61
 Mandibles slender with pointed apical teeth; thyridia indistinct or obsolete; flagellum
 long and slender. 61
61. Gastrocoeli rather pronounced; sternites strongly chitinated, the plica reduced or
 lacking; area superomedia large, nearly rectangular, usually a little wider than
 long. *Ctenichneumon* Thomson 62
 Gastrocoeli small and shallow; sternites less chitinated, plica including at least the
 third sternite; area superomedia square or longer than wide, usually narrowed
 a little towards the apex. 62
62. Abdomen strongly elongate and gradually narrowed towards the end, the second and
 third tergite longer than wide at the apex. (Flagellum extremely slender; black,
 legs mainly yellowish-red.) *Limerodops* Heinrich 63
 Abdomen of normal, longish-oval shape. *Pseudamblyteles* Ashmead
63. Hypopygium with a long, middle projection which may be pointed or slightly
 truncate at the apex (Figs. 51-53). (Thyridia distinct.) 64
 Apical margin of hypopygium straight or only slightly produced in the middle. 65
64. Area superomedia transverse. (Row of tyloides starts on the second or third,
 rarely on the fourth, segment of the flagellum and covers at least 15 segments,
 usually 20 or more.) *Eutanyacra* Cameron 66
 Area superomedia square or longer than wide. (Row of tyloides in few species as
 long as in *Eutanyacra*, usually however beginning not before the fourth or fifth
 segment of the flagellum.) *Spilichneumon* Thomson
65. Area superomedia narrowed anteriorly, hexagonal or semi-oval, costulae strong; sides
 of the postpetiolus and anterior tergites rather strongly punctured. 52
 Area superomedia of different outline, usually approximately quadrangular. 66
66. Clypeus with gross punctures at the apical margin, often confluent into short, irregular
 longitudinal striate. *Chasmodon* Ashmead 67
 Clypeus of normal sculpture. 67

67. Thyridia distinct. *Ichneumon* Linnaeus and
Thyrateles Perkins 68
 Thyridia indistinct or obsolete.
68. Flagellar segments with strongly developed transverse ridges on the inner side and a little constricted at their base, thus giving the apical part of the flagellum a more or less nodular appearance; gastrocoeli considerably deepened; sculpture of anterior tergites very rough. (Area superomedia relatively large, square or a little wider than long.) *Ctenichneumon* Thomson
 Flagellum normal, not nodular; gastrocoeli shallow; sculpture of anterior tergites not rough. 69
69. Row of tyloides beginning on second segment of flagellum; gastrocoeli forming a very shallow impression, which is longer than wide and traversed by a few very irregular wrinkles; claspers wide and blunt at apex; apical margin of the penultimate sternite slightly emarginate. *Limerodops* Heinrich
 Row of tyloides not beginning before fourth segment of flagellum, usually later; gastrocoeli not longer than wide, usually approximately as wide as long, sometimes sub-obsolete; claspers more narrowed towards the apex; apical margin of the penultimate sternite straight. *Pseudamblyteles* Ashmead
70. Females. 71
 Males. 76
71. Apex of abdomen amblypygous or almost so; abdomen slender and elongated; flagellum bristleshaped. 72
 Apex of abdomen oxygygous; abdomen not slender and not elongated; flagellum filiform or bristleshaped. 74
72. Gastrocoeli and thyridia obsolete; abdomen strongly tapering towards the apex and simultaneously a little compressed laterally. (Scutellum a little raised above postscutellum; costulae strong; postpetiolus and anterior tergites smooth and shiny or alutaceous; flagellum very slender and not at all widened; main color of the known species ferruginous.) *Ectopimorpha* Viereck
 Gastrocoeli and thyridia present; apex of abdomen not or hardly tapering and not compressed. (Gastrocoeli shallow, longer than wide.) 73
73. Area superomedia longer than wide, approximately rectangular, clearly defined; scutellum considerably raised above postscutellum; flagellum extremely slender and long, not at all widened; legs very long and slender. (Abdomen orange-yellow with black apex; length 16-17 mm.) *Neamblymorpha*, new genus
 (Type-species: *Ichneumon mikvus* Cresson)
 Area superomedia considerably wider than long, expanded horseshoe-shaped, often weakly bordered in the posterior part; scutellum flat; flagellum distinctly widened and flattened beyond the middle; legs rather stout. (Black including legs; length 16-17 mm.) *Anisopygus* Kriechbaumer
74. Flagellum bristleshaped, extremely slender, not at all widened; ovipositor distinctly projecting; hypopygium long; apex of abdomen slightly compressed laterally. (White anal marks present in most of the species.) *Exephanes* Wesmael
 Flagellum filiform or if attenuated distinctly widened beyond the middle; ovipositor usually not projecting, but if so, hypopygium short. 75
75. Horizontal part of the propodeum as long as, or even longer than, the apical part and densely reticulate all over; area superomedia rectangular and considerably longer than wide; flagellum strongly widened beyond the middle and sharply attenuated; in the type of the genus and in a closely related species tarsi I and II more or less widened. (Postpetiolus smooth with few scattered punctures; handsome species 16-20 mm. long; in the holarctic black with white banded tibiae.) *Eupalannus* Wesmael
 Horizontal part of the propodeum shorter, rarely reaching the same length as the apical part and not densely reticulate all over; area superomedia usually hexagonal, often confluent with the area basalis; flagellum in most of the species filiform, rarely attenuated; tarsi I and II never widened. (Numerous species of different sizes between 5 and 17 mm.; main color brown, ferruginous, or black, with or without a yellow or white pattern on the tibiae.) *Craticheumon* Thomsen
76. Scutellum strongly elevated, slanting from the culminating point shortly and steeply to its base, and making a longer and more gradual slope to the postscutellum. (Gastrocoeli shallow but rather large, considerably longer than wide; legs and abdomen orange-yellow, the latter black at apex.) *Neamblymorpha*, new genus
 Scutellum flat above or simply convex. 77

77. Area superomedia longer than wide, almost rectangular, often narrowed posteriorly, sometimes rendered indistinct by gross reticulation; horizontal part of the propodeum grossly and densely irregularly reticulated. (Large black species with a white pattern on the tibiae.) *Eupalamus* Wesmael^a
- Area superomedia not longer than wide or horizontal part of the propodeum less strongly and densely reticulated. 78
78. Thyridia and gastrocoeli entirely lacking, the latter being replaced by a short, dash-shaped, longitudinal fissure above the lateral slope of the base of the second tergite; postpetiolus smooth and polished. (Tergites two and three lemon-yellow, narrowly black at the apex, the other tergites black.) *Ectopimorpha* Viereck partim (Type—species only.)
- Thyridia and gastrocoeli more distinct; if subobsolete, the postpetiolus very finely striate. 79
79. Postpetiolus with very fine and indistinct longitudinal striation; thyridia subobsolete. (Gastrocoeli weakly indicated by a slight longitudinal impression; second tergite alutaceous with very fine puncturation.) 80
- Postpetiolus without longitudinal striation, exceptionally irregularly longitudinally reticulated but in the overwhelming majority of species smooth, sometimes alutaceous; thyridia distinct, although sometimes small. (Second tergite usually shiny with distinct punctures, in a few species alutaceous.) 81
80. Abdomen narrow and elongated; the second tergite considerably longer than wide at the apex, the third distinctly longer than wide. (Main color of abdomen ferruginous.) *Ectopimorpha* Viereck partim
- Abdomen less narrowed and elongated; the second tergite little longer than wide at the apex, the third wider than long or square. *Exephanes* Wesmael
81. Area superomedia rather large and wide, rounded anteriorly; costulae lacking. (Length about 16 mm.; black with some white pattern on head and thorax; no annulus on flagellum; legs III black except a small white mark at the base of the tibiae.) *Anisopygus* Kriechbaumer
- Area superomedia smaller and differently shaped; costulae present. (Numerous species of different sizes ranging from very small to rather large size.) *Cratichneumon* Thomson

I. Tribe Protichneumonini

Morphological characters

Flagellum.—Female flagellum with very few exceptions bristle-shaped, more or less, sometimes very strongly widened beyond the middle and attenuated at the apex.

Head.—Cheeks and temples usually moderately narrowed, sometimes more or less inflated; apical border of clypeus often with a minute projection in the middle or slightly bisinuate; sometimes carina oralis elevated; mandibles usually normal, in one group of nearctic species placed below in the genus *Coelichneumon* (azotus group) mandibles abbreviated, and widened, with strong, subequal, gaping teeth.

Thorax.—Scutellum usually flat, sometimes more or less convex and elevated above the postscutellum, but in the nearctic species never conically raised; propodeum slanting down backward in a more or less abrupt curve (more gradually in *Coelichneumonops*), the area dentiparae curved down usually close to the base of the coxae III; apical part of the carinae dentiparae externae in side view never diverging from the apical part of the carinae metapleurales but running parallel or even converging toward it; apex of the area dentiparae never forming a prominent corner; areolation of the propodeum in the overwhelming majority of species complete, except that the area basalis and superomedia are often confluent; area superomedia always narrowed or rounded anteriorly, shaped like a horseshoe, gothic arch, semi-oval or hexagon; the edge between mesopleuron and mesosternum often with a more or less pronounced hump near its apex, a feature

^aIn some specimens the area superomedia is not longer than wide. These can not be distinguished from *Cratichneumon* by morphological characters.

characteristic of the tribe; mesosternum often concave in the apical part, its apical border raised.

Legs.—Usually moderately stout; coxae III in the female of the majority of species distinguished by a scopa of specifically varying size.

Abdomen.—Female abdomen strongly oxypygous in the nearctic region with the exception of one genus and species (*Amblyjoppa magna* Cresson); postpetiolus normally striate or striate-punctate, in the nearctic *azotus* group of *Coelichneumon* regularly punctate, in a few other nearctic species scabrous, in *Coelichneumonops* sometimes alutaceous; gastrocoeli in the majority of species large and deep, often wider than their interval, rarely of medium size and depth.

Color

Abdomen metallic blue, black or red, never with white anal marks, but sometimes with white lateral marks on the anterior tergites. Basic color of thorax always black or metallic blue.

Sexual dimorphism

Relatively slight, much less than in the tribe Ichneumonini; white pattern of head, thorax and legs following the general rule, much more developed in the males than in the females; the basic color of the abdomen however always the same in both sexes.

Biological characters

Hosts.—Protichneumonini do not feed on Rhopalocera. They have however, as parasites, spread over an amazing variety of different families of *Heterocera*, attacking almost all of them. In the Holarctic region Protichneumonini have been recorded as parasites of *Sphingidae*, *Arctiidae*, *Lymantriidae*, *Notodontidae*, *Noctuidae*, *Geometridae*, *Pyrilidae* and even *Tortricidae*.

Hibernation.—In contrast to the Ichneumonini, females of this tribe do not hibernate. This may be considered as a distinctive biological character of the tribe. It seems that the Protichneumonini produce only one generation per year; whether this rule applies to all species remains to be investigated.

Food of the adult.—Adults of this tribe are not regular visitors to umbelliferous flowers, like the Ichneumonini, although now and then an individual may go astray to such source of food. Instead they are eager searchers for, and customers of, the honey dew produced by aphids of various kinds, especially tree infesting species.

Distribution

Protichneumonini are mainly Holarctic and relatively scarce in true tropical climates. They are abundant, however, in higher elevations of tropical mountains, especially in the Himalayan Zone of the Oriental region, where they evidently reach their highest development and greatest differentiation. In the Nearctic region so far four genera with approximately fifty species are recorded. The *Heresiarches*-group of genera, which I believe to be placed the best in this tribe, has not been found in the New World.

Remarks

In extension of the general geographical limitation of this publication I have included in the treatment of this particular tribe the whole fauna of America North of Mexico, as far as known until now. In contrast to the tribe Ichneumonini, where the tremendous number of species in combination with a high degree of confusing sexual dimorphism still forbids a comprehensive treatment of the whole North American fauna, the Protichneumonini seemed to allow and to need a first general synopsis. I suppose that our present knowledge may comprehend about 90 percent of the species occurring in the eastern parts of

North America, while the western mountains will certainly harbour a much greater number of unknown forms.

The group of metallic blue species of *Coelichneumon* deserve special attention. In the Nearctic there are a surprising number of different forms which in their similarity of color represent a taxonomic puzzle. Much more material and research will be needed in order to recognize the limits of individual mutability and regional variability of these blue species.

In the following keys the term "white" will be used in a generalized sense covering all shades between pure white and yellow.

1. Genus *Protichneumon* Thomson

Protichneumon Thomson, 1893, Opusc. Ent., fasc. 18, p. 1899.

Type-species.—*Ichneumon fusorius* Linnaeus, designated by Ashmead, 1900.

The genus shares all general characters with *Coelichneumon* Thomson, in particular the strongly oxyptygous abdomen of the female, the pronounced, deep gastrocoeli, the striate or striate-punctate sculpture of the postpetiolus. It is morphologically distinguished from *Coelichneumon* by nothing else than a slight deviation of the propodeal areolation: the area superomedia—usually horseshoe-shaped or with the outline of a gothic arch—is raised anteriorly a little above the level of the horizontal part of the propodeum, so that the areae superoexternae slope very slightly from the borders of the anterior part of the area superomedia toward the sides and simultaneously toward the base of the propodeum. This character however occurs also in the Oriental genus *Aglaojoppa* Cameron, which is hard to distinguish from *Coelichneumon*. The most remarkable character of the *Protichneumon* species is their considerable size. In this particular case size is not a mere casual feature but the manifestation of an important biological character: the specialization of this genus for Sphingidae as its host. The host specialization and the size, as indicative of the latter, seems to be the only character justifying the separation of *Protichneumon* and *Coelichneumon*.

Key to the Species of the Genus *Protichneumon* Thomson of America North of Mexico Females and Males

1. Legs III entirely black. 2
 Legs III entirely or at least the tibiae III red or reddish brown. 4
2. Scopa very large, trimmed flat on top; postpetiolus always red; scutellum more raised and more densely punctured than in the alternative species; widest segment of female flagellum hardly more than twice as wide as long; tyloides of male flagellum narrower than in the alternative species; size 17-20 mm. (Scutellum and pronotal ridge not white marked.) 2. *effigies*, new species
 Scopa small, not very dense, exceptionally absent; postpetiolus black, exceptionally obscure reddish; scutellum less raised, sparsely punctured and shiny; widest segment of female flagellum three times as wide as long; tyloides of male flagellum wider than in the alternative species; size 19-25 mm. (Scutellum and pronotal ridge often white marked.) 3
3. Tergites 2-4 normally chitinated, not strongly separated nor bulging laterally, with normally dense, not very strong sculpture. (Scutellum and pronotal ridge often white marked.) 1a. *grandis grandis* Brullé
 Tergites 2-4 very strongly chitinated, sharply separated, sometimes slightly bulging laterally toward the apex, with extremely dense and gross sculpture. (Scutellum and pronotal ridge seldom white marked.) 1b. *grandis regnatricis* Cresson
4. Apical half of postpetiolus, tibiae and tarsi III and the apical part of femora III reddish-brown; tyloides of male flagellum relatively wide-oval, the longest reaching almost from base to apex of the segments. (Scutellum of the male white marked; length 23-26 mm.) 1c. *grandis victoriae*, new subspecies
 Entire first segment and entire femora and tibiae III bright red, tarsi III dark; tyloides of male flagellum narrower and shorter than in the alternative species. (Scutellum not white marked in the male; length 19 mm.) 3. *polytropos*, new species

1. *Protichneumon grandis* (Brullé)

Figs. 6, 9, 16

Distribution

The distribution of the conspecies according to H. Townes, 1951 is: "Transcontinental in Canad., Transit. and U. Austr. Zones". According to new records it includes also the Lower Austral Zone, Georgia and Louisiana (A.N.S., U.S.N.M.). This huge area of distribution, however, is not inhabited by homogeneous populations. Rather strong regional differences are evident, the limits and status of which are not yet thoroughly investigated. For the time being I propose to distinguish two subspecies strongly differing in sculpture in the Eastern Zone and a third from Vancouver Island, distinguished by color.

Female

Wings strongly infuscated; head and thorax black with a more or less restricted, or no, white pattern; scutellum from entirely black to entirely white; tergites 2-7 red; rather small scopa; flagellum strongly widened, the widest segment about three times as wide as long; length 19-25 mm.

Flagellum.—Rather stout, bristleshaped, strongly widened beyond the middle and strongly attenuated at the apex, with 47-53 segments, the first hardly twice as long as wide, the eighth square, the widest about three times as wide as long. Black with white annulus on segments six or eight to 15 or 16.

Head.—Temple profile somewhat narrowed with slightly curved outline; cheek profile distinctly narrowed with straight outline; malar space little shorter than the width of the mandible base; cheeks not inflated. Black; frontal orbits narrowly (sometimes extending downward a little beyond the level of the antennal base) and marks on the vertical orbits are usually white.

Thorax.—Scutellum considerably raised above the postscutellum, with moderately dense and moderately strong punctuation, gradually sloping down toward the apex, carinated laterally at the very base; edge between mesopleuron and mesosternum with a pronounced hump near the apex; area superomedia usually longer than wide, gradually narrowed toward the base, approaching the shape of a gothic arch; costulae weak. Black entirely or sometimes with the collare and apex of pronotal ridge white marked and the scutellum white in various extent.

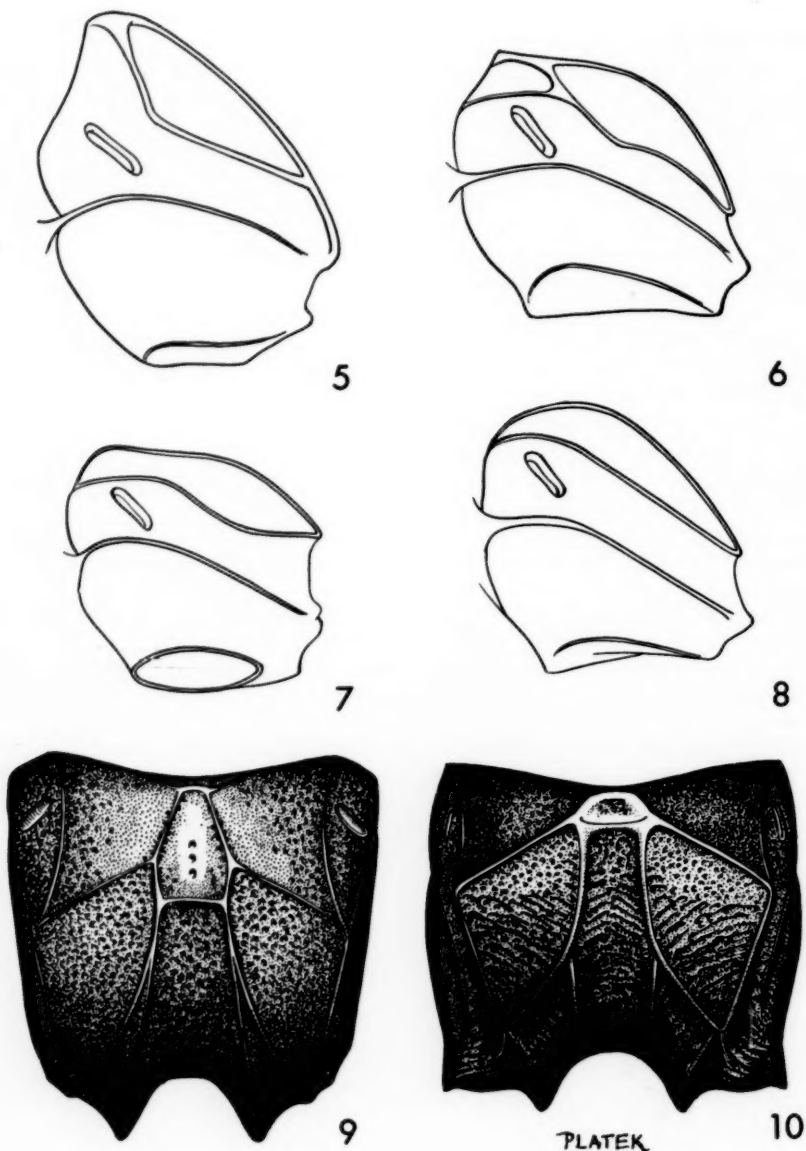
Legs.—Stout, femora fat; coxae III strongly punctured with a medium-sized scopa which may be rarely lacking. Black with the tibiae I below and usually the apical border of trochanters I, white.

Abdomen.—Median field of postpetiolus more or less distinctly striate at the base, grossly punctured at the apex. Tergites 2-7 red, the first tergite black, very rarely the postpetiolus reddish.

Male

Flagellum without annulus; with long, relatively wide, oval tyloides, the longest reaching from base to apex of the segments; area superomedia usually transverse; pronotal ridge and scutellum from black to white; length 22-27 mm.

The following are white: mandibles except base, labrum, clypeus, face, frontal orbits, marks of the vertical orbits, outer orbits except temple region, scape below, usually collare, pronotal ridge usually at the apex, sometimes entirely, often subalarum in part, sometimes mark on the tegulae, the scutellum in various extent, large marks on coxae I and II and on trochanters I and II below, femora I and II below except narrow base, tibiae I and II below and tarsi I and II usually except the narrow apices of the segments. In the type of *ambiguus* the tarsi III, too, are mainly white.



Figs. 5-10. 5, *Conocalama occidentalis* (Cresson), ♀, propodeum profile; 6, *Protichneumon grandis* (Brullé), ♀, propodeum profile; 7, *Orgichneumon calcatorius* (Thunberg), ♀, propodeum profile; 8, *Coelichneumonops solutus* (Holmgren), ♀, propodeum profile; 9, *Protichneumon grandis*, ♀, propodeum; 10, *Conocalama occidentalis* (Cresson), ♀, propodeum.

1a. *Protichneumon grandis grandis* (Brullé)

Ichneumon grandis Brullé, 1846, Hist. Nat. Ins. Hym., vol. 4, p. 300, ♀.

Ichneumon ambiguus Cresson, 1864, Ent. Soc. Phila. Proc., 3: 161, ♂.

Types

Holotypes.—*Ichneumon grandis* Brullé, ♀, Pennsylvania, Museum National d'Histoire Naturelle, Paris. *Ichneumon ambiguus* Cresson, ♂, Pennsylvania, A.N.S.

Distribution

Eastern Canadian and Transition Zones south to and including Pennsylvania, where this and the following subspecies meet. The western limits of the range not yet known.

Female and male

Tergites considerably less chitinized than in the following subspecies, neither strongly separated from one another nor bulging laterally at the apices, with normal, even surfaces; the second to fourth rather strongly and densely punctured but not grossly sculptured as in the following subspecies. Color of abdomen relatively light brownish-red; the white pattern of the thorax in average more extended. Legs III black.

Remarks

The type of *grandis* Brullé comes from Pennsylvania, the area where this and the following subspecies meet. H. Townes, who has seen the type, kindly wrote to me that he considers it intermediate between both subspecies, but closer to the northern. I therefore chose *grandis* as the name for the northern subspecies.

1b. *Protichneumon grandis regnatrix* (Cresson)

Ichneumon regnatrix Cresson, 1864, Ent. Soc. Phila. Proc. 3: 178, ♀.

Protichneumon grandis Townes, 1951, Synoptic Catalogue, p. 304, ♀, partim.

Types

Holotype.—♀, Delaware (A.N.S.).

Distribution

From Pennsylvania south. Florida (C.N.C.), Georgia, Louisiana (A.N.S.), Kansas (C.G.H.).

Female and male

Tergites strongly chitinized, distinctly constricted at the base, strongly separated, the outline especially of the fourth tergite somewhat bulging; sculpture very gross and dense; color of abdomen darker red than in *grandis grandis*, scutellum less frequently white marked, legs III black.

Remarks

The type of *regnatrix* has no trace of scopa and its postpetiolus is obscurely reddish. A second female specimen from Delaware in the Cresson collection shows the same characters, while all the other specimens I have seen from the Austral Zone have a normal scopa and black postpetiolus. I therefore presume that the type of *regnatrix* represents a rare, individual mutant rather than another species.

1c. *Protichneumon grandis victoriae*, new subspecies**Types**

Holotype.—♀, British Columbia, Victoria, 27.VIII.1927. C.N.C. No. 6996.

Allotype.—♂, British Columbia, Malahat, 30.III.1929 (W. Downes). C.N.C.

Distribution

British Columbia: Vancouver Island.

Female and male

Apical part of the postpetiolus, apical part of femora III and the tibiae and tarsi III light reddish-brown; length 23-26 mm.

In the holotype the scutellum is entirely black while the scutellum of the allotype bears a white mark.

2. *Protichneumon effigies*, new species

Fig. 15

Holotype.—♀, Maine, Dryden, 25.VII.1956. C.G.H.

Allotype.—♂, Kansas, Topeka, U.S.N.M.

Paratypes.—2 ♀♀, British Columbia, Robson, 3.VIII.1947 and 21.IX.1948 (H. R. Foxlee); 1 ♀, Ontario, Nipigon, 6.VII.1956. C.G.H. 3 ♀♀, British Columbia, Robson (H. R. Foxlee); 1 ♀, Alberta, McMurray, 10.VIII.1953 (G. E. Ball); 1 ♀, Manitoba, Russell, 17.VII.1954 (Brooks-Wallas); 1 ♀, Ontario, Rockcliffe, 6.IX.1940 (G. S. Walley); 1 ♀, Quebec, Aylmer, 23.VII. 1926 (C. B. Hutchings). C.N.C.

Distribution

Newfoundland, Ontario, Manitoba, Saskatchewan, Alberta, British Columbia (C.N.C.); Maine (C.G.H.); Pennsylvania (A.N.S.); Michigan, Kansas, Montana, South Dakota, Colorado (U.S.N.M.).

Female

Wings strongly infuscated; *thorax* including *scutellum* black without any white pattern; *tergites* 1-7 red; very large, flat-trimmed *scopa*; *flagellum* moderately widened, the widest segment hardly more than twice as wide as long; length 17-20 mm.

Flagellum.—Bristleshaped, moderately widened beyond the middle, strongly attenuated at the apex; 47-49 segments, the first more than twice as long as wide, the eighth or ninth square, the widest about twice as wide as long. Black with white annulus on segments seven or eight to 14 or 15.

Head.—Temple profile somewhat narrowed with slightly curved outline; cheek profile rather strongly narrowed with straight outline; malar space about as long as the width of the mandible base; cheeks not inflated. Black, frontal orbits narrowly and small marks on the vertical orbits white.

Thorax.—Scutellum more strongly raised above the postscutellum than in *grandis*, more strongly and densely punctured and more abruptly sloping at the apex; area superomedia shorter than in *grandis*, usually less narrowed anteriorly, horseshoe-shaped or sometimes transverse; hump on the edge of mesopleuron and mesosternum distinct. Entirely black.

Legs.—Longer, a little less stout than in *grandis*; coxae III with very large *scopa*. Black, the narrow apices of femora I and II internally and the tibiae I below white.

Abdomen.—Median field of the postpetiolus densely and strongly punctured apically, usually more or less distinctly striate at the base; tergites 2-4 strongly and very densely punctured, opaque, the fifth sparsely and finely punctured; gastrocoeli wider than their interval, which is striate. Red including the first segment; sometimes the petiolus infuscated.

Male

Flagellum without annulus, the *tyloides* on segments six or seven to 18 or 19, elongate-oval and considerably narrower than in *grandis*; coxae, pronotol ridge and scutellum not white marked, the last grossly and densely punctured, sloping

more deeply and more abruptly down to the apex than in *grandis*; abdomen red including the first segment or at least the post-petiolus.

3. *Protichneumon polytropus*, new species

Types

Holotype.—♂, North Carolina, Boardman, bred by W. F. Fiske (U.S.N.M.).

Male

Wings infuscated; abdomen including first segment, femora III and tibiae III bright red; head and thorax black, the latter without white pattern; flagellum without annulus, with longish-oval tyloides on segments 8-22; area superomedia twice as long as wide with the outline of a gothic arch; tergites 2-5 strongly separated, with gross sculpture; length 19 mm.

Flagellum.—With 45 segments, the tyloides a little narrower and relatively a little shorter than in *grandis*; basal segments relatively shorter than in *grandis*.

Head.—Temple profile not quite so strongly narrowed as in *grandis*, the outline very slightly curved; malar space half as long as the width of the mandible base. Black; the following white: mandibles except apex, sides of clypeus and face broadly, frontal orbits narrowly, a mark on the vertical orbits, a short and narrow stripe on the middle of the outer orbits and a mark on the scape below.

Legs.—I and II black with the tibiae and tarsi I and partially the tarsi II whitish below; femora and tibiae III vivid red with narrowly black apices; tarsi III dark.

Abdomen.—Gastrocoeli deep, their interval narrower than one of them; median field of the postpetiolus and the interval of the gastrocoeli strongly striate; the dorsal surface of the following four tergites grossly and irregularly striate-punctate; tergites 2-5 strongly separated and bulging a little laterally toward the apex. Bright red.

2. Genus *Amblyjoppa* Cameron

Amblyjoppa Cameron, 1902, Entomologist 35:108.

Type-species.—*Amblyjoppa rufobalteata* Cameron. Monob.

The genus is mainly distinguished by the amblypygous abdomen of the female combined with considerable size as in *Protichneumon*. Postpetiolus averaging wider and flatter than in *Protichneumon*, its median field less prominent and less clearly defined, not longitudinally striate, usually coriaceous-punctate. The female flagellum is slenderer than in *Protichneumon* and never strongly widened. Scutellum usually more elevated.

The genus is specialized for Sphingidae as hosts, as far as known for Sphingidae semanophorae.

The center of differentiation and distribution appears to be the Oriental Region of the Old World. Two species occur in Europe, only one is recorded from North America.

1. *Amblyjoppa magna* (Cresson)

Amblyteles magnus Cresson, 1865, Ent. Soc. Phila. Proc. 4:258, ♂.

Types

Holotype.—♂, Colorado (A.N.S.).

Male

Wings infuscated; black, tergites two and three pale ferruginous; facial orbits broadly yellow, frontal orbits narrowly and indistinctly obscure yellowish; vertical orbits with a slight indication of an obscure yellowish mark; length 23 mm.

3. Genus *Coelichneumon* Thomson

Coelichneumon Thomson, 1893, Opusc. Ent. fasc. 18, p. 1901.

Type-species.—*Ichneumon lineator* Gravenhorst, designated by Ashmead, 1900. *Ichneumon* Townes, 1951, Synoptic Catalog, p. 301.

For the relation to, and morphological differentiation from *Protichneumon* see the latter genus.

Flagellum bristleshaped (with rare exceptions), normally more or less widened beyond the middle; areae dentiparae curved downward in a more or less abrupt slope and reaching close to the base of coxae III. Area superomedia usually horseshoe-shaped or hexagonal, often confluent with the area basalis. Postpetiolus with distinct median field, in typical species longitudinally striate or striate-punctate, in the North American *azotus*-group regularly and strongly punctured, in few species rugose or coriaceous. The middle of the anterior tergites often striate. Gastrocoeli large and deep, sometimes wider than their interval. Female abdomen strongly oxygygous. Size of the scopa often specifically characteristic.

Numerous species in the Palearctic, Nearctic and Oriental Region. All species are parasites of various groups of Heterocera.

Key to the species of *Coelichneumon* Thomson in America North of Mexico

a. Females

1. Tergites 1-4 or 5 with white marks laterally at the apex. (Length 18 mm.
 1. *phaenomenon*, new species 2
 Tergites without white marks except sometimes the first.
2. Legs black or blue 3
 Legs red. 49
3. At least abdomen blue or with a distinct metallic blue tint. 4
 Abdomen pure black without metallic tint. 25
4. Whole thorax including the mesoscutum metallic blue or bluish-black. 5
 At least the mesoscutum pure black without metallic tint, sometimes the whole thorax
 pure black. 15
5. Basal half of the tibiae III on the outer side, and the apex of coxae I and II white.
 (Scopa enormous, evenly trimmed; handsome species 20 mm. long.)
 Tibiae III and coxae II not white marked. 2. *pulcherior*, new species 6
6. Scopa large or extraordinarily large (covering about one-fourth or more of ventral
 area of coxae), very dense, evenly trimmed. 7
 Scopa very small, not very dense and not evenly trimmed, or entirely absent. 11
7. Temples and cheek profile not strongly narrowed, their outlines more or less curved;
 sides of scutellum and the whole length of the pronotal ridge white. 8
 Temples and cheek profile strongly narrowed, their outlines straight or almost so;
 sides of scutellum and pronotal ridge with restricted or without white pattern. 9
8. Flagellum strongly widened, the widest segment almost three times as wide as long;
 scopa extraordinarily large. (Striking species 19 mm. long.) 3. *magniscopa*, new species
 Flagellum hardly widened, the widest segment about 1.5 times as wide as long; scopa
 rather large but not extraordinarily. (Somewhat smaller species 16 mm. long.)
 4. *columbianus*, new species
9. Flagellum little widened, the widest segment hardly twice as wide as long.
 9. *masoni*, new species
 Flagellum strongly widened, widest segment about three times as wide as long. 10
10. Flagellum with 40-42 segments, moderately long; pronotal ridge, subalarum and sides
 of the face exceptionally white marked. 7. *sassacus* (Viereck)
 Flagellum with 43-45 segments, long; pronotal ridge, subalarum and sides of face more
 or less extensively white marked. 8. *sassacoides*, new species

11. Scopa absent. (Pronotal ridge and sides of scutellum broadly white.) 12
 Small scopa present. 13
12. Prescutellar carinae and apical half of coxae II white; temple and cheek profile little narrowed, with curved outlines; flagellum hardly widened, the widest segment hardly 1.5 times as wide as long. (Length 17 mm.) 6. *neomexicanus*, new species
 Prescutellar carinae and coxae II not white marked; temple and cheek profile distinctly narrowed with nearly straight outlines; flagellum moderately widened, the widest segment twice as wide as long. (Length 16 mm.) 10. *midus*, new species
13. Pronotal ridge broadly white for its whole length; sides of scutellum broadly white; mesoscutum clearly metallic blue. (Cheeks and temples a little wider than in the alternative species; length 18 mm.) 5. *leucographus*, new species
 Pronotal ridge and scutellum not or hardly white marked;; mesoscutum bluish-black. 14
14. Flagellum strongly widened beyond the middle and little attenuated at the apex, the widest segment more than two times as wide as long. (Length 16 mm.) 12. *similior*, new species
 Flagellum moderately widened beyond the middle, more strongly attenuated at the apex, the widest segment twice as wide as long. (Length 16-17 mm.) 13. *obscuratus*, new species
15. Sterna, pleura, propodeum, coxae, femora and tibiae all considerably marked with white. (Conspicuous species; length 17-19 mm.) 14. *pulcher* (Brullé)
 Not all the above-mentioned parts white marked. 16
16. Scopa present. 17
 Scopa absent. 20
17. Flagellum short, strongly widened, the widest segment four to five times as wide as long; mesoscutum opaque in the anterior part, never marked with white. (Scutellum usually entirely black, rarely marked with white apically; abdomen with slight bluish tint; length 15-18 mm.) 22. *barnstoni* Morley
 Flagellum longer and considerably less widened; mesoscutum not opaque in the anterior part, usually with median lines. (Scutellum with white sides.) 18
18. Basic color of the propodeum black without metallic tint. (Widest segment of flagellum two times as wide as long or less; flagellum short, with 32-34 segments; mesopleuron between speculum and anterior border strongly convex; length 14 mm.) 16. *eximius*, new species
 Propodeum and sometimes also pleura with distinct bluish tint. 19
19. Very small species 10-11 mm. long; widest segment of flagellum twice as wide as long or less; mesoscutum without central white stripes. 17. *pomiloaeneus*, new species
 Conspicuous species 13-16 mm. long; widest segment of flagellum more than twice as wide as long; mesoscutum usually with central white stripes. 15. *eximius* (Stephens)
20. Propodeum with distinct metallic blue tint. 21
 Propodeum pure black without metallic tint. 22
21. Pronotal ridge and scutellum not white marked; flagellum very strongly widened, the widest segment three times as wide as long. (Length 17 mm.) 18. *chalybeus* (Cresson)
 Sides of scutellum and pronotal ridge white; widest segment of flagellum little more than twice as wide as long. (Mesoscutum with middle lines.) 15. *eximius* (Stephens) variety or subspecies?
22. Scutellum entirely black or almost entirely white, never medially black with white sides. 23
 Scutellum medially black, the sides white. 24
23. Scutellum white except at the base; flagellum moderately widened; rather small and slender species. (Pronotal ridge white; mesoscutum usually with white median stripes; length 11 mm.) 21. *vitalis* (Cresson)
 Scutellum black; flagellum very strongly widened; rather stout species. (Pronotal ridge entirely or in part black; mesoscutum very rarely with median stripes; length 13-14 mm.) 19. *neocretatus*, new species, variety
24. Cheeks inflated; flagellum with 43 segments, the widest less than twice as wide as long. (Length 16 mm.) 20. *foxleei*, new species
 Cheeks not inflated; flagellum with 37-39 segments, the widest 3 to 3.5 times as wide as long. (Length 13-14 mm.) 19. *neocretatus*, new species
25. Tibiae III white banded. 26
 Tibiae III not white banded. 27

26. Scopa present; small species 10-11 mm. long; flagellum not strongly attenuated; scutellum black with white sides. (First tergite never white marked.) 26. *navus* (Say)
 Scopa absent; larger species 13-19 mm. long; flagellum strongly attenuated; scutellum white. (First tergite usually white marked; carina metapleurals and carina denticulae exteriores diverging.) see *Orgichneumon calcatorius* (Thunberg)
 Tribe *Ichneumonini*
27. Scutellum black with white lateral stripes; small species 10-14 mm. long. (Short white lateral marks at the apex of the scutellum are not included in this category.) 28
 Scutellum entirely black, entirely white, or black with white apex; bigger species 13-22 mm. long. (Apical white coloration of the scutellum sometimes divided into two separate lateral marks.) 30
28. Flagellum filiform, not attenuated at the apex, unusually short, with less than 30 segments. (Scopa small; head large; length 10-12 mm.) 27. *brunneri* (Rohwer) (rare individual variety)
 Flagellum bristleshaped, distinctly attenuated at the apex, of normal length with more than 30 segments. (Small scopa.) 29
29. Widest segment of flagellum about three times as wide as long; flagellum moderately attenuated at the apex; frons shiny, sparsely punctured; middle of second and third tergites strongly striate. (Frontal orbits and sometimes facial orbits white; length 10-14 mm.) 24. *pumilionobilis* Heinrich
 Widest segment of flagellum less than twice as wide as long; flagellum strongly attenuated at the apex; front very densely and finely punctured, almost opaque; only the interval of the gastrocoeli shortly and weakly striated. (White of inner orbits reduced to a spot at the level of the antennae; length 9-12 mm.) 25. *tauma* Heinrich
30. Wings strongly and uniformly infuscated. (This group contains the largest species of the genus.) 31
 Wings not or indistinctly infuscated. 38
31. Ovipositor projecting unusually far, approximately as long as the petiolus; mandibles slender, tapering. (No scopa.) 32
 Ovipositor not unusually projecting; mandibles strong. 33
32. Scutellum black; temple profile hardly narrowed and with distinctly curved outline. (Length 18 mm.) 36. *terebrifer*, new species
 Apical half of scutellum white; temple profile strongly narrowed and with an almost straight outline. (Length 18 mm.) 35. *terebratus*, new species
33. Carina oralis strongly elevated in the shape of a blade, which runs in a straight, unbroken line through to the mandible base. (Large, trimmed scopa; postpetiolus punctured; scutellum black; length 16-18 mm.) 32. *viola* (Cresson)
 Carina oralis normal. 34
34. Coxae III without scopa. 35
 Coxae III with distinct scopa. 36
35. Coxae II and III, especially their inner part, smooth and shiny with few scattered punctures, glabrous; scutellum flat, smooth, with few punctures; clypeus normal, wide; area superomedia horseshoe-shaped; large species 20 mm. long. (Postpetiolus striate at base, punctate at apex; infuscation of the wings usually moderate.) 29. *orpheus* (Cresson)
 Coxae II and III uniformly and rather strongly punctured, internally sparsely hairy, faintly indicating a scopa; scutellum convex, strongly and densely punctured; clypeus narrowed apically with oblique sides, its base convex medially; area superomedia large, hexagonal, approaching a square shape; length 16 mm. (Postpetiolus very finely rugose at base, punctate at apex.) 45. *neocitimus*, new species
36. Scutellum and subalarum white; flagellum hardly widened; temple profile rounded, not narrowed. (Scopa small, slightly raised; length 17-18 mm.) 31. *nigraticolor* (Viereck)
 Scutellum and subalarum black, rarely inconspicuously marked with white; flagellum considerably widened; temple profile distinctly narrowed. 37
37. Frons not at all concave at level of lower ocellus; postpetiolus usually coriaceous or punctured, sometimes irregularly reticulate; scopa large, dense, trimmed. (Widest segment of flagellum three times as wide as long; area superomedia hexagonal, rugose and opaque as is the whole surface of the propodeum; largest species of the genus; length 18-22 mm.) 34. *maurus* (Cresson)

Frons somewhat concave at level of lower ocellus; postpetiolus regularly longitudinally striate; scopa small and not very dense. (Flagellum a little less widened than in the alternative species; area superomedia hexagonal but with less sharp corners, approaching somewhat the horseshoe-shaped type; length 18-20 mm.)

33. *histricus* (Cresson)
38. Flagellum exactly filiform, unusually short, with less than 30 segments, not widened; length 10-12 mm. (Scopa small; head large; scutellum black.) 27. *brunneri* (Rohwer)
- Flagellum more or less attenuated and longer, with more than 30 segments, often widened beyond the middle; bigger species. 39
39. Mandibles stout, rather short, their strongly developed apical teeth separated by a wide gap, similar to the *Listrodromini*; postpetiolus punctate. 40
- Mandibles normal, the apical teeth not separated by a wide gap; postpetiolus striate or striate-punctate. 44
40. Coxae III with scopa. 41
- Coxae III without scopa. 42
41. Prescutellar carinae not white; inner orbits white for length of face or almost so; cheek profile more narrowed than in the alternative species; widest segment of flagellum 1.5 to 2 times as wide as long. (Pronotal ridge and at least the apical half of the scutellum white, usually also an apical mark on the postpetiolus; length 15-16 mm.) 41. *azotus* (Cresson)
- Prescutellar carinae white; orbits of face not white; cheek profile less narrowed; flagellum not widened. (Pronotal ridge and apex of scutellum white, postpetiolus never white marked; length 14-17 mm.) 43. *punctifer*, new species
42. Carina oralis and carina genalis somewhat elevated at the point of their junction and forming a sharp, angular, little projection; propodeum relatively long, and gradually sloping; abdomen long and narrow; apical margin of clypeus a little bisinuate. (Length 14-18 mm.) 40. *jejunus* (Cresson)
- Carina oralis and genalis normal; propodeum short and steeply sloping; abdomen normally stout; apex of clypeus normal. 43
43. Cheek profile not narrowed, head in front view almost square, temples inflated; mandibles unusually short and stout, not much longer measured from base to gap than upper tooth; femora III rather slender; apex of abdomen blunt. (Pronotal ridge and scutellum apically white; length 12-15 mm.) 44. *quadriceps*, new species
- Cheek profile distinctly narrowed, temples not inflated; mandibles moderately stout, from base to gap about twice as long as upper tooth; femora III stout; apex of abdomen attenuate. (Pronotal ridge and the apex of scutellum narrowly white; length 13 mm.) 42. *walleyi*, new species
44. Flagellum short, unusually widened beyond the middle, with abbreviated basal segments, widest segment at least 3 times as wide as long. 45
- Flagellum long, not unusually widened, with longer basal segments, widest segment less than 2.5 times as wide as long. 46
45. No scopa; mesoscutum distinctly shiny, not opaque in the anterior part; abdomen pure black without any metallic tint. (Scutellum usually not white marked; area superomedia horseshoe-shaped; length 16 mm.) 23. *ater* (Cresson)
- Scopa present; mesoscutum densely punctured and opaque, especially in the middle of the anterior part; abdomen usually with a vague metallic tint. (Scutellum often with white lateral marks at apex; area superomedia approximately horseshoe-shaped; length 15-18 mm.) 22. *barnstoni* Morley
46. Coxae III with distinct scopa. (Pronotal ridge, subalarum and at least the apex of the scutellum, often its apical half, white; similar in appearance to *orpheus* but smaller and the temples narrower; length 17-18 mm.) 28. *pervagus* (Cresson)
- No scopa. 47
47. Small species 10-13 mm. long; temples and cheeks distinctly narrowed; inner and outer orbits almost entirely white. (Abdomen in fresh specimens with metallic blue tint; mesoscutum often with two median stripes; scutellum usually white in the apical half.) 21. *vitalis* (Viereck)
- Large species 17-20 mm. long; temples and cheeks wide; white coloration of orbits less extensive. 48
48. White color pattern of head and thorax restricted; middle of mesoscutum and postpetiolus never white, the pronotal ridge only apically white; scutellum usually with white apical mark only; cheeks a little less widened than in the alternative species. (Length 20 mm.) 29. *orpheus* (Cresson)

- White color pattern more extended; postpetiolus with white apical band, sometimes the mesoscutum with white median stripes; pronotal ridge and scutellum entirely or mostly white. (Length 18 mm.) 30. *pepticus* (Cresson)
49. Scopa distinct; abdomen with metallic bluish tint or bright metallic blue; wings clear. 50
- No scopa; abdomen black or black and red without metallic tint; wings sometimes infuscated. 51
50. Abdomen bright metallic blue; pronotal ridge, sides of the scutellum and usually two median stripes of the mesoscutum white. (Length 14 mm.) 11. *rubroaeneus*, new species
- Abdomen with metallic bluish tint; pronotal ridge and mesoscutum not white marked, instead the prescutellar carinae white marked. (Length 16 mm.) 39. *semilaevis* (Cresson)
51. Flagellum extraordinarily widened, the widest segment more than three times as wide as long, the fifth segment square; scutellum flat. (In the holotype, abdomen and coxae black; in another specimen from California, abdomen in part and the coxae, red; length 17 mm.) 37. *flagellator*, new species
- Flagellum little widened, the widest segment hardly twice as wide as long, the tenth segment square; scutellum distinctly raised above postscutellum. (Abdomen black or first segments reddish; coxae red; length 17 mm.) 38. *rubricoxa*, new species

b. Males

Our taxonomic knowledge of the North American *Coelichneumon* males is still less advanced than that of the females. The males of many species are much harder to collect than females and therefore scarcer in collections. As a result males of a number of species are still unknown and in some other cases too few specimens are available to achieve a definite taxonomic evaluation. The latter is especially difficult as the males lack several of the most important characters of the female sex, for example the differentiation of flagellar proportions and of the structure of the coxae III. Thus the male key depends greatly on variable color characters. The user of the male key should realize that it is less complete than the female key.

1. Abdomen black, at least tergites 1-3 with white lateral marks. 1. *phaenomenon*, new species
Abdomen otherwise colored. 2
2. Femora III entirely or mainly red. 3
Femora III black or metallic blue, sometimes marked with white. 6
3. Abdomen metallic blue or bluish-black. 4
Abdomen black without metallic blue tint, sometimes partly red or brown. 5
4. Abdomen blackish-blue; pronotal ridge entirely or partly black, prescutellar carinae usually white marked; tibiae III dark. 39. *semilaevis* (Cresson)
- Abdomen bright metallic blue; pronotal ridge and probably median lines of the mesoscutum white, prescutellar carinae not white marked; tibiae III red. 11. *rubroaeneus*, new species
(♂ unknown)
5. Postpetiolus strongly and densely punctured, irregularly rugose; scutellum considerably raised above level of postscutellum; coxae red; facial orbits white. 38. *rubricoxa*, new species
- Postpetiolus regularly striate; scutellum less raised; coxae black. 37. *flagellator*, new species
(♂ unknown)
6. Tibiae III and sometimes also the tarsi III with more or less extensive white color pattern (in some cases reduced to a narrow basal mark on the tibiae). 7
Tibiae III without any white color pattern. 25
7. Scutellum with white lateral bands and black median part. (The white lateral stripes sometimes joining at the apex of the scutellum.) 8
Scutellum entirely white, or entirely black, or black with white apex, but not with white sides and black middle. 16
8. Abdomen black without metallic tint. (Mesoscutum without median stripes; small species.) 9
Abdomen metallic blue. (Mesoscutum often with white median stripes.) 10

9. All trochanters white; coxae I and II white in the greater part, sometimes entirely; first and usually also second segment of tarsi III white at base. (Tibiae III with broad white annulus at the base.) 26. *navus* (Say)
Trochanters II and III black with white apical border; coxae I and II black with small white apical marks; only metatarsus III basally white. (Tibiae III white at base, the white usually extending further on outer side than on inner.) 27. *brunneri* (Rohwer)
10. Mesoscutum black without metallic tint. 11
Mesoscutum more or less distinctly metallic blue. 13
11. Sterna entirely white; meso- and metapleura with large white bands or marks; femora and tibiae III white, black at base and apex; mesoscutum with long, white median stripes. 14. *pulcher* (Brullé)
White color pattern much more restricted. 12
12. Pleura and propodeum with rather distinct metallic blue tint; femora III and tibiae III in greater or lesser extent white marked on outer side; tarsi white marked. 15. *eximius* (Stephens)
Pleura and propodeum black without any metallic blue tint; femora III entirely black, tibiae III sometimes with an indistinct whitish longitudinal stripe basally at the outer side; no white pattern on the tarsi. (Usually distinctly smaller than *eximius*.) 16. *eximius*, new species, variety
13. Tibiae III white externally for almost their whole length; all tarsi mostly white. 3. *magniscopa*, new species
White color of tibiae III and tarsi considerably more restricted. 14
14. Vertex a short distance behind the eyes with a rather distinct edge separating the vertex from the declivity of the occiput; temples relatively strongly narrowed with almost straight outline; malar space little less than half as long as width of base of mandible. (Mesoscutum and femora III bright metallic blue; mesoscutum, postpetiolus and prepectus not white marked; tibiae III narrowly white at the base above; trochanters II white below.) 7. *sassacus* (Viereck)
Vertex without a distinct edge, temples less narrowed; malar space one third as long as the width of the mandible base. (White marks different.) 15
15. Temples slightly but distinctly inflated. (Median field of face blue; mesoscutum without median stripes; tibiae III very narrowly marked with white at the base above; trochanters II black; postpetiolus and prepectus white marked.) 5. *leucographus*, new species
Temples distinctly narrowed. several unassociated species
16. Carina oralis more or less elevated. (Postpetiolus punctured; scutellum white, at least in great part; mesoscutum often with median stripes.) 17
Carina oralis normal. 18
17. Carina oralis strongly lamellately elevated, running in a straight, unbroken line through to the mandibles; tibiae III and usually also the metatarsi III with percurrent dorsal stripes. (Prescutellar carinae marked with white; mesoscutum often with median stripes; scutellum white; wings moderately infuscated, usually clearer basally; length 16-20 mm.) 32. *viola* (Cresson)
Carina oralis broken angularly at its junction with the carina genalis and forming at the point of junction an angular little projection; tibiae III dorsally at the base with a white stripe, usually extending to about the middle of the tibia, but varying in length, rarely lacking entirely; metatarsus III not white marked. (Mesoscutum usually with white median stripes; prescutellar carinae not white marked; scutellum at least partly white; length 14-17 mm.) 40. *jejunus* (Cresson)
18. Mandibles normal; postpetiolus longitudinally striate. 19
Mandibles stout and short, their strongly developed apical teeth separated by a wide gap, similar to the *Listrodromini*; postpetiolus punctate. 21
19. Area superomedia large, strongly widened, rounded anteriorly; carina dentiparae exteriores and carina metapleuralis diverging; pleura and postpetiolus white marked; length 16 mm. or more. see *Orgichneumon calcatorius* Thunberg
Tribe Ichneumonini
Area superomedia of normal shape; carina dentiparae exteriores and carina metapleuralis converging; pleura and postpetiolus not white marked; length 11-12 mm. 20

20. Abdomen black without metallic tint; tibiae III and metatarsi III white at base; femora III black including the apex. (Scutellum white only at apex.) 27. *bruneri* (Rohwer), variety
 Abdomen with metallic bluish tint (in fresh specimens); tibiae III with narrow, white annulus at the base, tarsi III without white pattern; femora III with white apical border. (Scutellum usually white, at least on the apical half; mesoscutum often with median stripes.) 21. *vitalis* (Cresson)
21. Prescutellar carinae white marked. (Trochanters I and II dark; white line on outer side of tibiae III extending approximately to the middle of the tibiae; mesoscutum with short median lines; postpetiolus usually with an interrupted white apical band.) 43. *punctifer*, new species
 Prescutellar carinae not white marked. 22
22. Flagellum with white annulus. (Tibiae III with narrow white mark basally above.) 44. *quadriceps*, new species
 Flagellum without annulus. 23
23. Carinae genalis and oralis meeting at a distance from base of mandible which is nearly equal to the width of base of mandible; the stout mandibles distinctly narrowed from base to gap, upper tooth considerably longer than the lower. (External white stripe of tibiae III usually not extending beyond middle of tibiae; tarsi III and apex of femora III not white marked.) 40. *jejunus* (Cresson)
 Carina genalis and carina oralis meeting a short distance from the inner angle of base of mandible, the distance being less than half the width of base of mandible; mandibles very stout, of equal width from base to gap, upper tooth a little longer than lower. 24
24. Postpetiolus with white apical band; mesoscutum with white median lines; tibia III almost entirely or completely white externally; length 15-17 mm. 41. *azotus* (Cresson)
 Postpetiolus and mesoscutum without white pattern; white line of tibia III reduced to a short stripe at the base externally; length 13 mm. 42. *walleyi*, new species
25. Flagellum with white annulus. 26
 Flagellum without white annulus. 34
26. Scutellum with white lateral bands and black median part. 27
 Scutellum entirely white, entirely black, or black with white apex, but not with white sides and black middle. 28
27. Inner and outer orbits white, narrowly interrupted only at the vertex and malar space; size small, 10-12 mm.; frons very densely punctured, alutaceous between punctures, opaque; abdomen never with bluish tint. 25. *tauma* Heinrich
 Outer orbits black, often also the frontal orbits; size larger, 16 mm.; frons not very densely punctured, distinctly shiny; abdomen usually with a slight metallic blue tint. (White color pattern variable; sides of face and clypeus always broadly white.) 22. *barnstoni* Morley, variety
28. Scutellum entirely or mostly white. 29
 Scutellum black or narrowly marked with white at apex. 32
29. Coxae II and III mostly white, coxae III white on upper side. (Sometimes mesopleuron and propodeum white marked.) 47. *albicoxa*, new species
 Coxae III black. 30
30. Small species with clear wings; frons and mesoscutum densely punctured, opaque; scutellum basally and apically with a median black spot, indicating a rudiment of the normal black middle line of the scutellum. 25. *tauma* Heinrich, variety
 Conspicuous species with more or less infuscated wings; frons and mesonotum shiny; scutellum more or less white, without rudiment of a black middle line. 31
31. Postpetiolus irregularly punctate-rugose. (Pronotal ridge and subalarum white.) 31. *nigraticolor* (Viereck)
 Postpetiolus regularly longitudinally striate. 33. *histricus* (Cresson)
32. Mesosternum slightly concave in the posterior part; its apical border distinctly raised; area superomedia hexagonal; length 18-22 mm. (Wings strongly and uniformly infuscated.) 33. *histricus* (Cresson), variety
 Mesosternum not concave, its apical border not distinctly raised; area superomedia not hexagonal, with rounded anterior border, approximately horseshoe-shaped; species of medium size; length 16-18 mm. 33

33. Scutellum strongly convex, strongly and rather densely punctured, carinated laterally at the base; tyloides on flagellar segments 9-22 or 6-21; wings uniformly, and rather strongly, infuscated. 46. *citimus* (Cresson)
and 45. *neocitimus* Heinrich
- Scutellum slightly convex, sparsely punctured; tyloides on flagellar segments 7-14; wings not, or slightly, infuscated. 23. *ater* (Cresson)
34. Scutellum entirely black, entirely white, or black with white apex, but not with white sides and black middle. 35
- Scutellum with white lateral lines and black median part. (The white lateral bands sometimes joining at the apex, sometimes reduced to the base laterally.) 40
35. Carina oralis and genalis distinctly raised at their junction and forming at this point a little angular projection. (Mandibles stout, the sharply pointed, longer, upper tooth separated from the lower by a wide gap; mesoscutum with or without median lines; length 14-17 mm.) 40. *jejunus* (Cresson), variety
- Carina oralis and genalis not raised. (Mandibles longer, normal.) 36
36. Postpetiolus with white apical band; mesoscutum usually with white median stripes; coxae III usually apicoventrally white. 30. *pepticus* (Cresson)
- Postpetiolus, mesoscutum and coxae III ventrally not white marked. 37
37. Area superomedia and areae superoexternae, like the rest of the surface of the propodeum, densely and strongly punctured and rugose, opaque; area superomedia hexagonal, more or less narrowed from the insertion of the costulae toward the area basalis; wings uniformly and strongly infuscated. 38
- Area superomedia and areae superoexternae of a different sculpture than the rest of the propodeum, never densely and strongly rugose, usually mostly smooth and shiny, rarely coriaceous or alutaceous; area superomedia not hexagonal, usually broadly horseshoe-shaped, transverse, sometimes approaching half-moon shape, sometimes nearly square; wings infuscated or clear. 39
38. Frons at the level of the lower ocellus slightly concave; postpetiolus longitudinally striate; tergites 2-4 densely punctured, the intervals smaller than the punctures; abdomen and femora III wider than in the alternative species; area superomedia and the carinae dentiparae exteriores not raised. 33. *bistricus* (Cresson), variety
- Frons at the level of the lower ocellus not in the least concave; postpetiolus irregularly rugose; tergites 2-4 with widely spaced punctures; abdomen relatively narrow, femora III slender; area superomedia distinctly raised above the level of the adjacent areas; carinae dentiparae exteriores curved and unusually strongly raised. (Scutellum black or white at the apex; flagellum never with white annulus; face and clypeus broadly black in the middle.) 34. *maurus* (Cresson)
39. Temple profile considerably narrowed; edge between mesosternum and mesopleura with a very small hump near the apex; wings clear; average length 18 mm. (Face and clypeus usually with less extensive black pattern than the alternative species; otherwise identically colored.) 28. *pervagus* (Cresson)
- Temple profile hardly narrowed; edge between mesosternum and mesopleuron without any indication of a hump; wings usually moderately infuscated except in the basal part; average length 21 mm. 29. *orpheus* (Cresson)
40. Abdomen black without metallic blue tint. (Face and clypeus white; smaller species about 12 mm. long.) 24. *pumilionobilis* Heinrich
- Abdomen metallic blue (Thorax without metallic tint.) 41
41. Thorax and abdomen short and wide; mesoscutum of about equal longitudinal and transverse diameter; mesosternum at the anterior border considerably wider than its median length; tergites 2-4 at least twice as wide as long. (Mesoscutum and postpetiolus not white marked; length 14 mm.) 19. *neocretatus*, new species
- Thorax and abdomen of normal, slender appearance; mesoscutum distinctly longer than wide; mesosternum scarcely wider than long; tergites 2-4 1.3 to 1.5 times as wide as long. (Mesoscutum usually with short white median stripes, postpetiolus with white apical marks; length 12-13 mm.) 16. *eximiops*, new species

1. *Coelichneumon phaenomenon*, new species

Types

Holotype.—♀, Maine, Dryden, 18.X.1953. C.G.H.

Allotype.—♂, Alaska, Chitina. U.S.N.M.

Paratype.—♀, Alberta, Banff. U.S.N.M.

Distribution

Maine, Alberta, Alaska.

Female

Black; scutellum white except base; pronotal ridge broadly white; tergites 1-4 or 1-5 with white marks apically at the sides; no scopa; flagellum long, strongly widened, widest segment about 2½ times as wide as long, length 18 mm.

Flagellum.—Bristleshaped, strongly widened beyond the middle, attenuated at the apex, with 47 segments (both specimens), the first about 2.5 times as long as wide, the tenth square, the widest about 2.5 times as wide as long, black with white annulus on segments 7-13 or 14.

Head.—Temple profile not rounded behind the eyes, distinctly narrowed; cheek profile distinctly narrowed, its lateral outlines straight; malar space hardly longer than mandible width; basal part of clypeus slightly convex. Black; the following white: inner orbits up to the level of the lower ocellus, triangular marks on the vertical orbits, a patch on the cheeks not extending to the mandible base. In the specimen from Alberta a short and narrow stripe on the outer orbits also white.

Thorax.—Edge of mesosternum and mesopleuron with a little hump near the apex; area basalis deepened; area superomedia a little wider than long, nearly horseshoe-shaped. Black; the following white: collare, pronotal ridge broadly, subalarum and scutellum except the base. In the specimen from Alberta a spot of the regulæ and the postscutellum partially white also.

Legs.—Coxæ III very densely punctured, hardly shiny; femora III rather slender. Black, apex of femora I below and tibiae I below white.

Abdomen.—Median field of postpetiolus and the whole length of the middle of the second to fourth tergite striate; ovipositor distinctly projecting. Black; postpetiolus and tergites 2-4 (holotype) or 2-5 with white marks laterally at the apex, which decrease gradually in size towards the apex of the abdomen.

Male

Flagellum.—Black, without annulus; scape white below. Tyloides on segments 7-21 narrow, lanceolate.

Head.—Malar space hardly half as long as the width of the mandible base. The following are white: face (except the median field), clypeus (except a mark in the middle), frontal orbits up to the level of the lower ocellus, outer orbits up to the region of the temples and the base of the mandibles.

Thorax.—Scutellum considerably raised above the postscutellum. The same parts are white as in the female.

Legs.—Marks on the coxæ and trochanters I and II below, femora and tibiae I and II below and the tarsi I in part, white.

Abdomen.—Black; postpetiolus and the second tergite with large white marks laterally at the apex, the third tergite with small marks.

2. *Coelichneumon pulcherior*, new species

Types

Holotype.—♀, Arizona, Mt. Lemmon, St. Catalina Mts., 9000 ft., 2-4.VIII. 1948. C.N.C. No. 6997.

Paratypes.—1 ♀, British Columbia, Salmon Arm, 20. VIII. 1925 (A. A. Dennys). C.N.C.; 1 ♀, British Columbia, Robson, 1948; (H. R. Foxlee). C.G.H.; 1 ♀, Colorado, Masonville. C.H.T.

Distribution

Arizona, Colorado, British Columbia.

Female

Bright metallic blue including head and thorax; pronotal ridge and sides of scutellum broadly white; basal half of tibiae III white externally; tarsi I and II and coxae I and II white marked; scopa unusually large, evenly trimmed; flagellum long, strongly widened, widest segment a little more than twice as wide as long; length 20 mm.

Flagellum.—Bristleshaped, strongly widened beyond the middle, attenuated at the apex, with 45 (holotype) to 51 segments, the first almost twice as long as wide, the tenth square, the widest a little more than twice as wide as long, black with white annulus on segments 7-14 or 16.

Head.—Temple profile rounded, not much narrowed behind the eyes; malar space equals about two-thirds of the width of the mandible base; mandibles normal. Metallic blue; the following white: base of mandibles, sides of clypeus, orbits broadly all around the eyes, interrupted narrowly at the malar space and sometimes at the temples.

Thorax.—As in *magniscopa* Heinrich; collare, pronotal ridge broadly, subalarum, tegulae partially and sides of scutellum white.

Legs.—Longer than in *magniscopa*, metallic blue; the following white: the narrow apex of femora I and II below for their whole length, segments 1-4 of tarsi I and II except their apices, basal half of tibiae III externally, apex of coxae I and II, sometimes also tarsi III partially.

Abdomen.—Median field of postpetiolus and interval between gastrocoeli strongly striate; tergites 2-4 strongly and rather densely punctured and distinctly separated by a slight basal constriction. Uniformly bright metallic blue dorsally.

3. *Coelichneumon magniscopa*, new species

Types

Holotype.—♀, Ontario, Grand Bend, 5.VII.1939 (T. N. Freeman). C.N.C. No. 7001.

Allotype.—♂, Ontario, Pt. Pelee, 4.VII.1927. C.N.C.

Paratypes.—2 ♀♀, North Carolina, Hamlock. C.H.T.

Distribution

Ontario, Massachusetts, Long Island, North Carolina, Florida.

Female

Bright metallic blue including head and thorax; pronotal ridge and sides of scutellum broadly white; scopa unusually large, evenly trimmed; flagellum strongly widened, widest segment more than twice as wide as long; length 19 mm.

Flagellum.—Bristleshaped, strongly widened beyond the middle, strongly attenuated towards the apex, with 44 segments, the first almost twice as long as wide, the ninth square, the widest nearly three times as wide as long, black with white annulus on segments 8-14.

Head.—Temple profile rounded, not much narrowed behind the eyes; malar space about two-thirds of the width of the mandible base; mandibles normal. Metallic blue; the following white: base of mandibles, whole length of inner orbits widened on the vertex triangularly and the lower two thirds of the outer orbits.

Thorax.—Mesosternum distinctly concave in the posterior part, its apical border raised; area superomedia a little wider than long, its anterior border subobsolete. Metallic blue; the following white: collare, pronotal ridge broadly, subalarum, tegulae partially and sides of scutellum.

Legs.—Stout, metallic blue; narrow apex of femora I and II below, tibiae I below and tibiae II below at the base and apex, white.

Abdomen.—Median field of postpetiolus and interval between gastrocoeli strongly striate; tergites 2-4 strongly and rather densely punctured. Uniformly metallic blue dorsally.

Male

Flagellum without annulus; tyloides longish-oval on segments 9-21; vertex behind eyes with slightly indicated edge; prepectus, postpetiolus and mesoscutum not white marked; trochanters II not white below; tibiae III except apex white exteriorly; all tarsi mainly white; mesoscutum metallic blue; length 19 mm.

The following are white: mandibles except base, labrum, sides of clypeus and face broadly, vertical orbits, outer orbits from below the temple region downward to the end of the eyes (widened considerably on the cheeks) scape below, collare, subalarum, pronotal ridge, tegulae, sides of the scutellum, coxae I below, apical mark of coxae II, femora I and II below except base, tibiae I and II below, all tarsi except apices of the segments of tarsi II and III narrowly and exterior side of tibiae III except the apex.

4. *Coelichneumon columbianus*, new species

Types

Holotype.—♀, British Columbia, Robson, 29.VII.1953 (H. R. Foxlee). C.G.H.

Female

Bright metallic blue including head and thorax; pronotal ridge and sides of the scutellum broadly white; scopa large but not unusually so, evenly trimmed; flagellum little widened, the widest segment less than twice as wide as long; length 16 mm.

Flagellum.—(Last segments lacking.) Bristleshaped; little widened beyond the middle, the first segment nearly twice as long as wide, the eleventh square, the widest about 1.5 times as wide as long. Black with white annulus on segments 8-14.

Head.—Temple profile and cheek profile distinctly narrowed with nearly straight outlines; the following white: sides of the clypeus, inner orbits of face and frons up to the level of the lower ocellus, a triangular mark on the vertical orbits, outer orbits up nearly to region of temples, somewhat widened below.

Thorax.—Mesosternum and mesopleura shiny, sparsely punctured, their edges without hump; mesosternum not concave and not elevated posteriorly; area superomedia about as long as wide, weakly bordered anteriorly; area basalis deepened. Bright metallic blue; the following white: collare, pronotal ridge and sides of the scutellum broadly, subalarum, tegulae partially.

Legs.—Stout. Metallic blue; the following whitish: tibiae I and the basal segments of tarsi I below, the narrow apex of femora I and II below.

Abdomen.—Gastrocoeli very large with narrow interval; median field of postpetiolus, the middle of the second tergite and the base of the middle of the third tergite striated; the fourth tergite sparsely and rather finely punctured, shiny. Uniformly bright metallic blue dorsally.

Remarks

Similar in color to *magniscopa* and *leucographus* but differing from both by the much more slender flagellum. The scopa of *columbianus* is much larger than that of *leucographus* and considerably smaller than that of *magniscopa*.

5. *Coelichneumon leucographus*, new species

Types

Holotype.—♀, Maine, Dryden, 6.IX.1951. C.G.H.

Allotype.—♂, Maine Portage, 25.VII.1956. C.G.H.

Paratype.—1 ♀, Ontario. C.N.C. No. 7010.

Female

Bright metallic blue including head and thorax; pronotal ridge and sides of the scutellum broadly white; scopa small, not trimmed; flagellum rather short, strongly widened, widest segment more than twice as wide as long; tergites 2-4 very densely punctured; length 18 mm.

Flagellum.—Bristleshaped, strongly widened beyond the middle and strongly attenuated at the apex with 42 segments, the first nearly twice as long as wide, the eighth square, the widest a little more than twice as wide as long, black with white annulus on segments 7-14.

Head.—Temple profile rounded, not much narrowed; cheek profile not much narrowed, with a slightly curved outline; malar space equals about two thirds of mandible width. Metallic blue; white are inner orbits up to the level of the lower ocellus, a triangular mark of the vertical orbits and the lower two thirds of the outer orbits.

Thorax.—Mesosternum not distinctly concave in the posterior part, its posterior border not distinctly raised; edge of mesosternum and mesopleuron with a little hump near its posterior end; are a superomedia a little wider than long, confluent with the area basalis. Metallic blue; the following white: collare, pronotal ridge broadly, subalarum, tegulae partially and the sides of the scutellum.

Legs.—Stout. Metallic blue; white are: narrow apices of femora I and II below, tibiae I and metatarsus I below.

Abdomen.—Median field of postpetiolus and the middle of tergite two striated; tergites 2-4 very densely punctured, almost opaque. Uniformly metallic blue dorsally.

Remarks

The type specimen strongly resembles *magniscopa* in color as well as in morphological characters. It seems to be distinguishable by the very small scopa, the much denser punctuation of the anterior tergites and some features of the mesosternum.

Male

Malar space one third as long as width of mandible base; flagellum without annulus; tyloides longish-oval on segments 6-18; vertex behind eyes without edge separating it from the declivity of the occiput; temples slightly inflated, distinctly curved; prepectus and postpetiolus white marked, not the mesoscutum; trochanters II not white below; tibiae III very narrowly marked with white at the base above; mesoscutum bright metallic blue.

The following white: mandibles except apex, labrum, clypeus, face except the median field, frontal orbits up to the level to the lower ocellus, triangular marks of the vertical orbits, lower half of the outer orbits (hardly widened on the cheeks), scape below, collare, pronotal ridge, subalarum, tegulae in part, sides of the scutellum, marks of the prepectus laterally, coxae I below, small mark of the coxae II apically, femora and tibiae I below, femora II below except base, tibiae II below, segments 1-3 of tarsi I laterally except apices and lateral marks on the apex of the postpetiolus.

6. *Coelichneumon neomexicanus*, new species

Types

Holotype.—♀, New Mexico, Manzano National Forest, 13.IX.1916. U.S.N.M.

Female

Bright metallic blue including head and thorax; pronotal ridge, sides of scutellum and prescutellar carinae broadly white; coxae I and II broadly white at the apex; no distinct scopa; flagellum hardly widened; length 17 mm.

Flagellum.—Bristleshaped, hardly widened beyond the middle, very strongly attenuated at the apex, with 44 segments, the first fully twice as long as wide, the eleventh square, the widest hardly 1.5 times as wide as long. Black with white annulus on segments 8-14.

Head.—Temple and cheek profile little narrowed with slightly curved outlines; malar space short, a little less than half as long as the width of the mandible base; cheeks wide between eye and carina genalis, rather strongly punctured, slightly inflated. Metallic blue; the following white: base of mandibles, inner orbits broadly on face and frons, confluent above with the vertical marks, outer orbits broadly from the temple region downward to the end of the eye.

Thorax.—Area superomedia and basalis confluent; mesosternum completely flat, its posterior border distinctly raised. Metallic blue; the following white: collar, pronotal ridge broadly, subalarum, regulae, sides of scutellum broadly, prescutellar carinae and a mark on the prepectus laterally.

Legs.—Femora III relatively slender; coxa III rather densely punctured with a little hump below on the inner edge near the apex, in the normal position of the scopa but covered only by scattered hairs. Metallic blue; the following white: coxae I except base, apical half of coxae II, apical half of femora I and II below, tibiae I and II below and indistinct marks on the base of tarsi I and II.

Abdomen.—Median field of the postpetiolus strongly striate at the base, strongly punctate-striate at the apex; middle of tergite two and tergites three and four basally in the middle striate, the rest of the surface of these tergites, except the apex of the fourth, densely and strongly punctured. Metallic blue.

7. *Coelichneumon sassacus* (Viereck)

Amblyteles (*Coelichneumon*) *sassacus* Viereck, 1917, Conn. State Geol. and Nat. Hist. Survey Bull. 22:349, 360, ♀.

Types

Holotype.—♀, Connecticut, Westville. Connecticut Agricultural Experimental Station, New Haven, Connecticut.

Neallotype.—♂, Maine, Dryden, 13.9.1951. C.G.H.

Distribution

Carolinian and Alleghenian Zones According Townes, 1951: Rhode Island, New York, Connecticut, Maryland. New records: Ontario, Quebec, Maine, New Hampshire. The record from California (Townes, 1951) needs confirmation.

Female

Bright metallic blue including head and thorax; pronotal ridge usually entirely blue, rarely with a restricted white mark at the apex; scutellum usually with restricted white marks laterally at the base, sometimes entirely blue; meso-scutum never with white median stripes; temples and cheeks narrowed; scopa large but not unusually so, evenly trimmed; flagellum rather short with 38-42 segments, strongly widened, the widest segment about three times as wide as long; length 13-17 mm.

Flagellum.—Bristleshaped, strongly widened beyond the middle and strongly attenuated at the apex, with 38-42 segments, the first twice as long as wide, the eighth square, the widest three times as wide as long. Black with white annulus on segments seven or eight to 12 or 13.

Head.—Temple profile and cheek profile strongly narrowed with almost straight outlines; malar space equal to width of mandible base; cheeks flat, not at all inflated, rather strongly punctured, especially in the upper part; mandibles slender, a little narrowed toward the apex. Bright metallic blue; the following white: frontal orbits up to level to lower ocellus (exceptionally extending downward a little on sides of face), marks on vertical orbits, a more or less extended narrow stripe on the outer orbits, sometimes a small dot on each side of the clypeus and on the mandible base.

Thorax.—Mesosternum somewhat concave in the median part posteriorly, the posterior margin a little raised; mesoscutum strongly and densely punctured; scutellum slightly convex, smooth with a few scattered punctures; area superomedia not bordered anteriorly; area basalis deepened. Bright metallic blue; the following white: collare, usually a small triangular mark on each side of base of scutellum, rarely a small mark or line at apex of the pronotal ridge which may exceptionally be elongated, rarely a dot or stripe on subalarum.

Legs.—Femora rather slender. Metallic blue; extreme apex of femora I and tibiae I whitish below.

Abdomen.—Median field of postpetiolus, the middle of second tergite and usually the middle of the third tergite more or less irregularly striate, the sides of the tergites strongly punctured; gastrocoeli large and deep with narrow interval; tergites 2-4 a little constricted at the base, strongly separated. Uniformly bright metallic blue dorsally.

TABLE I
Variability of *C. sassacus* (Vier.) females
Based on 28 specimens

Distribution of White										Number of flag- ellar segments			White flag- ellar annulus	
Mark on orbits of temples	Frontal orbits	Frontal orbits prolonged on sides of face	More or less extended stripe on outer orbits	Little dot on sides of clypeus	Short triangular mark on sides of base ⁷	Scutellum entirely blue	Mark or line on subalarum	Subalarum blue	Dot at apex of pronotal ridge	Interrupted narrow line along pronotal ridge	Pronotal ridge entirely blue			
28	28	2	28	8	24	4	4	24	2	2	24	3		
												38		
												39		
												40		
												41		
												42		
													on segments 7-12	
													7-13	
													8-12	
													8-13	
												21	2	
													2	
													2	
													3	

⁷of scutellum

Variability

The preceding table of female variability is based on a series of 28 specimens from Maine. It reveals a relatively high constancy of the white color pattern and number of flagellar segments. We might expect a similar degree of constancy in other metallic species of the genus.

Male

Malar space little less than half as long as width of mandible base; flagellum without annulus; tyloides narrow, longish-oval, on segments eight or nine to 18 or 19; vertex behind eyes with a rather distinct edge separating it from the declivity of the occiput; temples relatively strongly narrowed with almost straight outline; mesoscutum, prepectus and postpetiolus not white marked; trochanters II white below; tibiae III with a narrow white mark at the base above; mesoscutum and femora III bright metallic blue.

The following white: mandibles except apex, clypeus sometimes except a small median apical mark, face except the median area, frontal orbits confluent with a mark on vertical orbits, outer orbits from below the temple region downward to the end of the eye (widened on the cheek), scape below, collare, pronotal ridge, subalarum, side of scutellum, coxae I below, mark on apex of coxae II, trochanters and trochantelli I and II below, femora I below, femora II below except base, tibiae and tarsi I and II below, narrow mark on base of tibiae III above.

8. *Coelichneumon sassacoides*, new species

Types

Holotype.—♀, British Columbia, Robson, 22.X.1948 (H. R. Foxlee). C.N.C. No. 6999.

Paratypes.—3 ♀♀, British Columbia, Robson, 7.IX.1953, 24.IX.1954, 29.IX.1958. (H. R. Foxlee). C.G.H.; 1 ♀, British Columbia, Robson, 20.VIII.1948 (H. T. Foxlee); 1 ♀, British Columbia (Rev. G. W. Taylor); 1 ♀, British Columbia. C.N.C.

Distribution

British Columbia.

Female

Bright metallic blue including head and thorax; sides of scutellum narrowly white, pronotal ridge white in varying extent; temples and cheeks narrowed; scopa rather large; flagellum long with 43-45 segments, widest segment three times as wide as long; length 16-18 mm.

Flagellum.—Bristleshaped, long, strongly widened beyond the middle and strongly attenuated at the apex, with 43-45 segments, the first twice as long as wide, the ninth square, the widest three times as wide as long. Black with white annulus on segments eight or nine to 13 or 14.

Remarks

This species is closely related to *sassacus* Viereck and agrees with it in all morphologic characters mentioned in the description of *sassacus*, except that the flagellum is longer by direct comparison of series of both species. Furthermore, the white pattern of the head and thorax are more extensive in *sassacoides* than in *sassacus*. They include in all examined specimens a mark on the sides of the clypeus, a mark on the base of the mandibles, the orbits of the face, a lateral mark on the scutellum and the pronotal ridge in part or completely. Whether *sassacoides* represents a western subspecies of *sassacus* or a different species can not yet be decided.

9. *Coelichneumon masoni*, new species

Types

Holotype.—♀, British Columbia, Squamish, Diamond Head Trail, 4000 ft., 11.VIII.1953 (W. R. M. Mason). C.N.C. No. 7000.

Distribution

British Columbia (Squamish).

Female

Bright metallic blue including head and thorax; pronotal ridge and scutellum not white marked, except a small spot at the apex of the former; scopa enormous, evenly trimmed, covering nearly half of the ventral surface of the coxae; flagellum long, little widened, widest segment hardly twice as wide as long; temples and cheeks rather strongly narrowed; length 15 mm.

Flagellum.—Bristleshaped, little widened beyond the middle, strongly attenuated at the apex, with 44 segments, the first about twice as long as wide, the 11th square, the widest hardly twice as wide as long, black with white annulus on segments 9-14.

Head.—Temple profile and cheek profile rather strongly narrowed, the former in a slightly curved, the latter in a straight outline; malar space nearly equal to the mandible width; mandibles rather slender. Metallic blue; the following white: frontal orbits narrowly, a short and very narrow stripe on the outer orbits in their lower part, a small mark on the vertical orbits.

Thorax.—Scutellum distinctly raised above postscutellum; area superomedia a little wider than long, indistinctly bordered anteriorly; mesosulcus somewhat widened and deepened posteriorly; posterior margin of mesosternum not raised. Metallic blue; only the collare and a very small spot at apex of pronotal ridge white.

Legs.—Rather slender. Metallic blue; apex of femora I and the tibiae I whitish below.

Abdomen.—Median field of the postpetiolus and the base of the interval of the gastrocoeli striated; gastrocoeli very large and deep with narrow interval; tergites 2-4 strongly and very densely punctured. Uniformly metallic blue dorsally.

10. *Coelichneumon nudus*, new species

Types

Holotype.—♀, Georgia, Summerville, 29.VII.1944 (P. W. Fattig). U.S.N.M.

Female

Very bright metallic blue including head and thorax; pronotal ridge and sides of the scutellum broadly white; no scopa; flagellum moderately widened, widest segment twice as wide as long; length 16 mm.

Flagellum.—Bristleshaped, moderately widened beyond the middle and strongly attenuated at the apex, with 43 segments, the first a little more than twice as long as wide, the ninth square, the widest twice as wide as long. Black with white annulus on segments 8-13.

Head.—Temple profile and cheek profile distinctly narrowed with nearly straight outlines; cheeks not inflated, rather flat; malar space more than half as long as width of mandible base. Bright metallic blue; the following white: the mandible base, lateral marks on the clypeus, the orbits broadly, but interrupted narrowly at the vertex and malar space, and more broadly at the temples.

Thorax.—Area superomedia wider than long, indistinctly bordered anteriorly. Bright metallic blue; the following white: collare, pronotal ridge broadly, subalarum entirely, sides of scutellum broadly.

Legs.—Coxae III strongly and densely punctured without any trace of a scopa. Metallic blue; the following white: narrow apex of coxae I, narrow apex of femora I and II below, tibiae I below and narrow apex of tibiae II above.

Abdomen.—Rather slender; median field of postpetiolus basally, middle of tergite two and base of middle of tergites three and four striate; apical part of postpetiolus strongly reticulate-punctate. Uniformly bright metallic blue dorsally.

11. *Coelichneumon rubroaeneus*, new species

Types

Holotype.—♀, California, Lake Almanor, 17.VII.1943. U.S.N.M.

Host

Ufeus plicatus Grote.

Female

Abdomen bright metallic blue; *basic color of head and thorax* bluish black; *mesoscutum* with two short white median stripes; *pronotal ridge and sides of scutellum* broadly white; *legs including coxae, and except for the infuscated tarsi, vivid red; temples wide; scopa distinct; length 14 mm.*

Flagellum.—Between bristleshaped and filiform, moderately widened beyond the middle and little attenuated at the apex, with 39 segments, slender, the first segment a little more than twice as long as wide, the eighth square, the widest about twice as wide as long. Black with white annulus on segments 8-14.

Head.—Temples wide, rounded, scarcely narrowed; cheek profile little narrowed with slightly curved outlines; malar space scarcely longer than half the width of the mandible base; mandibles strong. Bluish black; the following white: inner orbits broadly from level of lower ocellus down to end of eye, stripe on vertical orbits and lower part of outer orbits.

Thorax.—Mesosternum completely flat, neither concave in the posterior part nor raised at the apex; scutellum flat. Bluish black, the mesoscutum and scutellum almost pure black; the following white: collare, pronotal ridge and sides of scutellum broadly, subalarum and a pair of rather indistinct, short median stripes on the mesoscutum.

Legs.—Rather stout; femora fat. Vivid red including coxae and trochanters; all tarsi and the tibiae III apically and above infuscated.

Abdomen.—Median field of the postpetiolus, middle of the second and base of the third tergite irregularly striate; apex of the postpetiolus reticulate-punctate. Uniformly bright metallic blue dorsally.

12. *Coelichneumon similior*, new species

Types

Holotype.—♀, Ontario, Nipigon, 7.VII.1956. C.G.H.

Paratype.—♀, Maine Dryden, 18.VIII.1959. C.G.H.

Female

Bright metallic blue including most of the thorax; pronotal ridge and scutellum not white marked except for a small spot at the apex of the former; scopa small, not very dense; flagellum of medium length, very strongly widened, the widest segment three times as wide as long, slightly attenuated at the apex; length 16 mm.

Flagellum.—Very strongly widened, the flat part extending almost to the apex which therefore is only slightly pointed; with 39 segments, the first almost twice as long as wide, the seventh square, the widest three times as wide as long, black with white annulus on segments 6-13.

Head.—Temple profile rounded, not much narrowed, cheek profile somewhat narrowed with a very slightly curved outline; malar space a little shorter than the mandible width. Dark metallic blue; the following white: frontal orbits up to the level of the lower ocellus narrowly, a narrow and short stripe in the middle of the outer orbits, and a mark on the vertical orbits.

Thorax.—Areae superomedia and basalis confluent; edge between mesosternum and mesopleuron without hump; mesosternum not concave and not raised posteriorly. Dark metallic blue, the mesoscutum almost black; white are: collare and a very small mark at the apex of the pronotal ridge; an indistinct small light spot basally at the sides of the scutellum.

Legs.—Rather stout. Almost black, tibiae I whitish below.

Abdomen.—Median field of postpetiolus and interval of gastrocoeli striated, postpetiolus punctate at apex; tergites 2-3 strongly and densely, tergite four a little less densely punctured. Uniformly bright metallic blue dorsally.

13. *Coelichneumon obscuratus*, new species

Types

Holotype.—♀, British Columbia, Robson, 10.IX.1955 (H. R. Foxlee). C.G.H.

Paratype.—♀, British Columbia, Robson, 25.VII.1949 (H. R. Foxlee). C.N.C.

Female

Abdomen bright metallic blue, head, mesoscutum and legs blackish-blue, nearly black; pronotal ridge and scutellum laterally without or with restricted white marks; cheeks and temples slightly rounded, moderately narrowed; scopa very small, not dense; flagellum moderately widened, the widest segment twice as wide as long; length 15-17 mm.

Flagellum.—Bristleshaped, moderately widened beyond the middle, attenuated at the apex with 41 segments, the first hardly twice as long as wide, about the ninth square, the widest twice as wide as long. Black with white annulus on segments 7-13.

Head.—Cheek profile and temple profile little narrowed with slightly curved outlines; malar space about two thirds of the width of the mandible base; cheeks seen from the side wide, distinctly though not strongly inflated, smooth with few scattered punctures. Black with indistinct bluish tint; frontal orbits, orbits of the vertex and the lower half of the outer orbits, white.

Thorax.—Mesosternum scarcely concave posteriorly; area superomedia confluent with the area basalis which is not deepened. Blackish-blue; collare, and (in the holotype) apex of pronotal ridge, white.

Legs.—The coxae blackish-blue, the rest without distinct metallic tint.

Abdomen.—Median field of the postpetiolus, the middle of the second tergite and the base of the third striate. Uniformly bright metallic blue dorsally.

Remarks

Differs from *sassacus* by the wider cheeks and temples and the small scopa, from *sassacoides* by the shorter and less widened flagellum and by the dark, blackish color of head, thorax and legs. The closest related to the eastern *similior* and perhaps a western subspecies of it, differing, however, by the much less widened and more strongly attenuated flagellum.

14. *Coelichneumon pulcher* (Brullé)

Ichneumon pulcher Brullé, 1846, Hist. Nat. Ins. Hym., v. 4:304, ♀.

Types

Holotype.—♀, North America. Museum National d'Histoire Naturelle, Paris.

Neallotype.—♂, Maine, Dryden, 10.VII, 1959. C.G.H.

Distribution

According H. Townes 1951 Rhode Island and New York south to Louisiana. New records: Maine (C.G.H.); Hamilton, Ontario (C.N.C.).

Female

The description is based on a specimen from Virginia.

Abdomen dark metallic blue; *head and thorax* pure black without metallic tint, with exceptionally rich white pattern; *pronotal ridge and sides of scutellum* broadly white; *mesoscutum* with long, white median stripes; *sterna, pleura, prepectus and all femora* with white pattern; *small white scopa*; *flagellum* little widened, the widest segment less than twice as wide as long; length 17-18 mm.

Flagellum.—Bristleshaped, little widened beyond the middle, strongly attenuated at the apex, with 44 segments, the first a little more than twice as long as wide, the eleventh square, the widest somewhat less than twice as wide as long. Black; white annulus on segments 9-14.

Head.—Temple profile and cheek profile distinctly narrowed with slightly curved outlines; malar space hardly half as long as width of mandible base; cheeks wide, a little inflated; mandibles broad. Black; the following white: mandibles, labrum, sides of clypeus and face broadly (leaving about median third black), broad orbits all around eye without any interruption, outer orbits widening below over almost the whole distance of the cheeks, scape below.

Thorax.—Mesosternum considerably concave in the posterior part, its posterior margin raised; scutellum convex, raised somewhat above the postscutellum; area superomedia indistinctly bordered in the part anterior of the costulae. Black; the following white: collare, pronotal ridge broadly, apex of pronotal base, subalarum, tegulae in part, two long median stripes of the mesoscutum, prescutellar carinae, sides of the scutellum broadly, postscutellum, apex of prosternum, all prepectus, a triangular mark on each side of the mesosulcus posteriorly, a band along the sternauli on the mesosternum, two transverse marks on the mesopleuron, one in the lower posterior part, the other in the upper anterior, a large mark on the area metapleuralis, the carinal triangle, a mark anterior to the spiracles of the propodeum, the apex of the area dentiparae and irregular bands following the carinae dentiparae interiores and the carina bordering the posterior part of the area superomedia.

Legs.—Rather slender. Black; the following white: coxae I and II except the narrow base, coxae III except most of the outer side and the basal part of the inner side, all trochanters almost entirely, femora I and II below except at the base and besides a longitudinal mark on their upper (black) side, an interrupted broad white band around the middle of the femora III, which widens on their interior side over the greater part of the surface, tibiae I and II below, a narrow band of tibiae II, a broad annulus of tibiae III and the tarsi I and II partially.

Abdomen.—Postpetiolus wide, rather flat, the median field and the following tergites narrowly in the middle at the base striate; tergites 2-5 rather strongly separated, not very densely punctured at the sides. Dark blackish blue with two white marks laterally at the apex of the postpetiolus.

Male

Tyloides on segments 8-20, narrow, small, longish-oval; flagellum without annulus. Distinguished unmistakably from all other species of the genus by the exceptionally rich white color pattern, especially on the sterna, pleura and all tibiae and femora. Length 16-18 mm.

Agrees in the shape and distribution of the white pattern almost entirely with the female as described above, except that the face and clypeus are white, and the white marks of the sterna are considerably more extensive, sometimes occupying almost their whole surface; the two white marks of the mesopleura are sometimes confluent, forming a white crossband extending from the lower apical part of the mesopleuron to its upper anterior part.

15. *Coelichneumon eximius* (Stephens)

Ichneumon eximius Stephens, 1835, Illustrations of British Entomology; or a synopsis of Indigenous Insects: Mandibulata, 7:486, ♀.

Ichneumon caeruleus Cresson, 1864, Ent Soc. Phila. Proc. 3:149, ♀.

Coelichneumon eximius Perkins, 1953, Bull. Brit. Mus. (Nat. Hist.) Entom. 3:107. (*I. caeruleus* Cress. synonymized).

Types

Holotypes.—*Ichneumon eximius* Stephens, ♀, British Museum, London, No. 3b. 1817. *Ichneumon caeruleus* Cresson, ♀, Illinois. A.N.S.

Neallotype.—♂, Maine, Dryden, 11.IX.1951. C.G.H.

Host

According to H. Townes, 1951: *Paraphia piniata* Pack., *Hemerocampa leucostigma* (A.&S.), *Isia isabella* (A.&S.). New host: *Abagrotis placida* Grote. The host *Achatodes zae* (Harr.), also recorded by Townes 1951, probably refers not to this species, but to *Coelichneumon eximiops*, new species.

Distribution

According to H. Townes 1951: "Atlantic to Cont. Divide in Canad., Transit., and U. Austr. zones."

Female

Abdomen bright metallic blue, thorax bluish black, the mesoscutum and scutellum pure black without metallic tint, the propodeum more distinctly metallic than the pleura; mesoscutum in most specimens with short, white median lines; pronotal ridge and sides of scutellum broadly white; scopa small; flagellum rather strongly widened, the widest segment about 2.5 times as wide as long; length 14-17 mm.

Flagellum.—Bristleshaped, rather strongly widened beyond the middle, moderately attenuated at the apex, with 36-41 segments, the first segment almost twice as long as wide, the eighth or ninth square, the widest about 2.5 times as wide as long. Black with white annulus on segments 7-12.

Head.—Temples rounded and a little narrowed; cheek profile somewhat narrowed, with slightly curved outline; cheeks wide, slightly inflated; malar space scarcely longer than half the width of the mandible base; mandibles strong. Bluish black; the following white: mandible base, labrum, sides of clypeus, orbits broadly around the eyes, interrupted narrowly at the vertex and malar space, broadly at the temples.

Thorax.—Mesoscutum little longer than wide; mesosternum slightly concave posteriorly in the middle; the hump of the mesopleura below the subalarum deepening considerably less pronounced than in *eximiops*, new species; area supermedia and basalis confluent, smooth and shiny as is the greater part of the areae

superoexternae. Bluish black; the mesoscutum and scutellum without metallic tint, pure black; the collar, subalarum, pronotal ridge broadly and the sides of the scutellum are white.

Legs.—Stout; femora thick; black, coxae bluish; the narrow apices of femora I and II below and the tibiae I below are white.

Abdomen.—Median field of postpetiolus and middle of the second tergite striate; ovipositor distinctly projecting. Uniformly bright metallic blue dorsally.

Variability

Out of the seven specimens from Maine: One has white marks at the apex of the postpetiolus laterally; three have white marks on the tegulae; one is without white median lines on the mesoscutum and the pronotal ridge white only at the apex.

Male

Description based on a series of nine specimens from Maine.

Malar space about one third as wide as mandible base; *flagellum* without annulus; *tyloides* narrow, longish-oval, on segments 8-18, the longest not extending to the apex of the segment; legs III with extensive white pattern on the outer side of the femora, tibiae, and tarsi; length 15-18 mm.

In addition to the white pattern as described for the female the following are white: clypeus and face entirely, mandibles except the apex, cheeks in greater part, scape below, mark on prepectus laterally, apex of prosternum, tegulae, post-scutellum, two apical marks on postpetiolus laterally, coxae I below, apex of coxae II, legs I and II including trochanters and tarsi below, outer side of tibiae III except the apex, outer side of tarsi, except the last segment and apices of the others, outer side of femora III more or less extensively. In one specimen coxae III also with a white mark below near the apex.

Remark

This species is extremely similar to *eximiops*, new species, the parasite of *Achatodes zeae*. Both species may be distinguished as follows:

TABLE II
Characters distinguishing *C. eximius* (Steph.)
from *C. eximiops*, new species

<i>eximius</i>	<i>eximiops</i>
Female	
propodeum and pleura distinctly metallic blue tinted;	propodeum and pleura pure black without metallic tint;
flagellum longer, with 36-41 segments;	flagellum shorter, with 32-34 segments;
flagellum more widened;	flagellum less widened;
mesopleura in the anterior part above weakly convex.	mesopleura in the anterior part above strongly convex.
Male	
length 15-18 mm.;	length 13-14 mm.;
propodeum distinctly bluish;	propodeum pure black;
legs III with extensive white pattern exteriorly.	legs III without white or with restricted white pattern exteriorly (base of tibiae only).

Three females from New Mexico, Texas and Alabama (U.S.N.M.) lack the scopa but seem otherwise indistinguishable from *eximius*. Whether they represent a southern subspecies, another species or individual mutants remains an open question.

16. *Coelichneumon eximiops*, new species**Types**

Holotype.—♀, Iowa, Atlantic, 19.VII.1913, bred from *Achatodes zeae* (Harr.). U.S.N.M.

Allotype.—♂, Illinois, Urbana, 18.V.1928, reared from pupa of *A. zeae*. U.S.N.M.

Paratypes.—4 ♀♀, and 1 ♂, Illinois, Urbana, ex. *A. zeae*; 1 ♂, Wisconsin, Dane Co., ex. *A. zeae*; 1 ♂, Kansas, Riley Co., U.S.N.M.; 1 ♀, Wisconsin, Dane Co., ex. *A. zeae*; 1 ♂, Illinois, Urbana, ex. *A. zeae*, C.G.H.

Host

Achatodes zeae.

Distribution

Illinois, Iowa, Wisconsin, Kansas.

Female

Abdomen dark metallic blue, slender; *head and thorax* black, without metallic tint; *pronotal ridge and sides of scutellum* broadly white; *mesoscutum* with white median stripes; *scopa* small; *temples* wide; *flagellum* short, scarcely widened; length 14 mm.

Flagellum.—Bristleshaped, short, scarcely widened beyond the middle, moderately attenuated at apex, with 32 (in five specimens) to 34 (one specimen) segments, the first 2.5 times as long as wide, the tenth square, the widest 1.5 to 2 times as wide as long. Black with white annulus on segments 7-12.

Head.—Temples wide, rounded; cheek profile moderately narrowed, with distinctly curved outlines; malar space very short, less than half as long as width of mandible base; mandibles strong. Black; the following white: mandible base, sides of clypeus, orbits all around the eye broadly, narrowly interrupted only at vertex and malar space.

Thorax.—Elongate, the mesoscutum considerably longer than wide; mesosternum somewhat deepened on both sides of posterior part of mesosulcus; mesopleuron below the deepening under the subalarum raised and forming a distinct hump; area superomedia narrowed and distinctly bordered anteriorly. Black; the following white: collare, pronotal ridge broadly, subalarum, sides of scutellum, two median stripes on mesoscutum, marks on prescutellar carinae.

Legs.—Rather short. Black; apex of femora I and II narrowly below, tibiae I below and sometimes the apex of coxae I narrowly, white.

Abdomen.—Slender, shaped as in *Chasmias*; median field of postpetiolus, middle of the second tergite and base of third in the middle striate; apex of the postpetiolus grossly and sparsely punctured; only the very apex of the ovipositor projecting. Uniformly dark metallic blue dorsally.

Male

Malar space extremely short, almost absent; *flagellum* without annulus; *tyloides* narrow, longish-oval, on segments 8-16, the longest in the middle of the row not extending to the base or apex of the segments; *legs* III usually without white pattern. Length 13-14 mm.

In addition to the white pattern as described for the female, the following are white: clypeus and face entirely, mandibles except the apex, cheeks in greater part, scape below, a mark on the prepectus laterally, tegulae, postscutellum, coxae I almost entirely, coxae II except base, tibiae and femora I and II below; tarsi I below partially, marks on trochanters I and II below, two apical marks

or an apical band on postpetiolus and in the single specimen from Kansas a white stripe on the outer side of the base of the tibiae III. The rest as in the female.

Remark

For the differences between this species and the very similar *eximius* Stephens see the latter.

17. *Coelichneumon pomilioaeneus*, new species

Types

Holotype.—♀, Maine, Dryden, 26.IX.1958, C.G.H.

Paratypes.—2 ♀♀, Maine, Dryden, 11.IX.1958 and 24.IX.1958, C.G.H.

Female

The smallest known metallic species of the genus; abdomen bright metallic purplish blue; head and thorax bluish black; the mesoscutum almost black with a very slight metallic tint; pronotal ridge narrowly and the sides of the scutellum white; scopa small; flagellum little widened, the widest joint twice or less as wide as long; length 9-10 mm.

Flagellum.—Bristleshaped, coming close to filiform, little widened beyond the middle and little attenuated at the apex, with 32-33 segments, the first segment twice as long as wide, the eighth square, the widest twice as wide as long or a little less. Black with white annulus on segments 7-12.

Head.—Like *eximius*, the cheeks slightly narrower. Bluish black, the following white: mark on mandible base, a little spot on sides of clypeus, inner orbits of frons only (holotype) or face also (paratypes); marks on vertical orbits and a narrow stripe on outer orbits.

Thorax.—Like *eximius*. Bluish black, the mesoscutum almost black; collare, pronotal ridge narrowly, sides of the scutellum, a mark of the subalarum, white.

Legs.—Like *eximius*. Coxae bluish; the rest black; apex of femora I, or I and II below, and tibiae I, below, white.

Abdomen.—Median field of postpetiolus and middle of second tergite striate; ovipositor slightly projecting. Metallic purplish blue dorsally.

Remarks

Except for the less widened flagellum, this form agrees morphologically with *eximius*. I do not feel absolutely sure therefore, about its status as a different species. The difference in size however is very striking and I have found no intergrades.

18. *Coelichneumon chalybeus* (Cresson)

Ichneumon chalybeus Cresson, 1877, Amer. Ent. Soc. Trans. 6: 146, ♀.

Types

Holotype.—♀, Massachusetts, A.N.S.

Female

Abdomen bright metallic blue; head and thorax black, except the propodeum, which is metallic blue; no scopa; flagellum very strongly widened, the widest segment three times as wide as long. Length 17 mm.

Flagellum.—Bristleshaped, strongly widened beyond the middle and sharply attenuated at the apex, with 45 segments, the first twice as long as wide, the seventh square, the widest almost three times as wide as long; the apex a little more attenuated than in *neocretatus*, the last 4-5 segments before the end-cone not being transverse as in *neocretatus*. Black; white annulus on segments 7-13.

Head.—As in *neocretatus*. Black; narrow frontal orbits, marks of the vertical orbits, white.

Thorax.—Area superomedia not transverse as in *neocretatus*, but fully as long as wide, anteriorly not clearly bordered; propodeum less abbreviated than in *neocretatus*. Black; propodeum metallic blue; only the collar white.

Legs.—Coxae III without trace of scopa, strongly punctured. Coxae and femora III tinged with blue.

Abdomen.—Sculpture of anterior tergites less rough than in *neocretatus*, their middle less striate.

Remarks

This species is very closely related to *neocretatus*, new species, and agrees with it except for the characters mentioned above as different. The blue color of the propodeum may be considered as the most distinctive specific difference. I have not seen another specimen of this species except the type.

19. *Coelichneumon neocretatus*, new species

Fig. 20

Types

Holotype.—♀, Maine, Mt. Blue, 30.IX.1956, C.G.H.

Allotype.—♂, Maine, Denmark, 24.VII.1956, C.G.H.

Paratypes.—2 ♀♀, Maine, Mt. Blue, 9.IX.1956 and 22.IX.1956; 2 ♀♀, Maine, Dryden, 20.VIII.1951 and 14.VIII.1956; 1 ♂, Maine, Greenville, 9.VII, C.G.H.; 1 ♀, Ontario, Galette; 1 ♀, Quebec, Aylmer; 1 ♀, Saskatchewan, Pike Lake; 1 ♂, Ontario, Marmora; 1 ♂, Quebec, Aylmer, C.N.C.; 1 ♀, New York, Cranberry Lake, U.S.N.M.

Host

Unknown; females seem to follow the aspen tree, as does the European *cretatus* Grav.

Distribution

Eastern Transition Zone (Quebec, Ontario, Maine, New York); one slightly different specimen from Kansas.

Female

Abdomen dark metallic blue; head and thorax pure black without any metallic tint; sides of the scutellum narrowly white (*holotype*), often scutellum entirely black; pronotal ridge usually white apically, sometimes entirely black; no scopa; flagellum very strongly widened, the widest segment three times as wide as long; propodeum short and strongly declivous; length 13 mm.

Flagellum.—Bristleshaped, strongly widened beyond the middle, sharply attenuated at the apex, with 37-39 segments, the first twice as long as wide, the seventh or eighth square, the widest 3-3.5 times as wide as long. Black with white annulus on segments 7-11.

Head.—Wide; temple profile rounded, scarcely narrowed; cheek profile little narrowed with curved outline; cheeks wide, slightly inflated towards the apex, strongly punctured; malar space half as long as width of mandible base. Black; frontal orbits (sometimes extending a little below the level of the antennae) and a mark on the vertical orbits, white.

Thorax.—Short; mesoscutum nearly as wide as long; scutellum convex, distinctly raised above the postscutellum; propodeum, the longitudinal median diameter of the horizontal part about half as long as the area posteromedia; area superomedia transverse; mesopleura strongly bulging anteriorly in the upper part. Black; the following white: collar and usually sides of scutellum narrowly and apical part or apex of pronotal ridge; scutellum and pronotal ridge sometimes entirely black. Rarely mesoscutum with short, white median stripes.

Legs.—Rather stout; femora thick; coxae III strongly and rather densely punctured without trace of scopa. Black; narrow apex of femora I, the tibiae I and the base of tarsi I below, white.

Abdomen.—Rather short; median part of postpetiolus and middle of second and third tergite striate, sides of anterior tergites strongly and not very densely punctured; apex of postpetiolus strongly punctured; gastrocoeli of medium size, their interval as wide as one of them. Dark metallic blue dorsally.

Male

Tyloides on segments 7-18, very small, short, narrow, oval, the longest covering the median half of the length of the segment; no annulus; abdomen relatively short, oval; propodeum short, area superomedia strongly transverse; gastrocoeli somewhat larger and deeper than in the female; length 14 mm.

In addition to the white pattern as described for the female, the following are white: mandibles except apex, labrum, scape below, face and clypeus except the middle, cheeks, orbits broadly (interrupted at the vertex and malar space), pronotal ridge broadly, subalarum, tegulae in part, marks on the prescutellar carinae, a mark on the prepectus laterally, legs I below including the coxae, trochanters and the basal segments of the tarsi, coxae II apically, mark of trochanters II below, the apex of femora II and the tibiae II below. Sometimes an irregular white crossband in the lower part of the mesopleura.

Variability

One female specimen from Kansas (C.G.H.) differs from all others having the pronotal ridge entirely white, a white stripe on the outer orbits and the subalarum also white. The flagellum is less widened, the widest segment being 2.5 times as wide as long. This specimen may represent another subspecies rather than an individual variety.

Remarks

In morphology, color and ecology this species is closely related to the Palaearctic *cretatus* Gravenhorst. It differs mainly in the metallic blue color of the abdomen and the considerably more strongly widened flagellum.

20. *Coelichneumon foxleei*, new species

Types

Holotype.—♀, British Columbia, Robson, 9.VIII.1956, (H. R. Foxlee) C.G.H.

Female

Abdomen metallic blue, head and thorax pure black without any metallic tint; scutellum with narrow white lateral stripes; temple profile broadly rounded, not narrowed; cheeks inflated; scopa absent; flagellum long, moderately widened, strongly attenuated; length 16 mm.

Flagellum.—Bristleshaped, long, moderately widened, strongly attenuated, with 43 segments, the first less than twice as long as wide, the eighth square, the widest little more than 1.5 times as wide as long. Black with white annulus on segments 8-14.

Head.—Temples wide, rounded, not narrowed; cheeks distinctly inflated, wide; malar space little more than half as long as width of mandible base; apical border of clypeus slightly projecting in the middle. Black; a triangular mark on the vertical orbits, frontal orbits very narrowly and an indistinct very short line in the middle of the outer orbits, white.

Thorax.—Mesosternum entirely flat and not at all raised posteriorly, the mesosulcus not crenulate in the anterior part, little widened in the posterior third; area superomedia confluent with the area basalis, smooth and shiny like the interior

part of the area basalis. Black; collare and narrow lateral lines on the scutellum, white.

Legs.—Black; femora rather stout.

Abdomen.—Median field of the postpetiolus not clearly defined apically, striate at the base, strongly reticulate-punctate at apex; gastrocoeli scarcely wider than the interval which is reticulate-punctate; second and third tergites densely and strongly punctured, the fourth finely and less densely punctured. Uniformly metallic purplish-blue dorsally.

Remark

Named in honor of Mr. Harold R. Foxlee whose many years of collecting in the region of Robson, British Columbia, have yielded the most comprehensive and valuable collection of Ichneumonidae so far procured from western Canada.

21. *Coelichneumon vitalis* (Cresson)

Ichneumon vitalis Cresson, 1877, Amer. Ent. Soc. Trans. 6: 149, ♀.

Types

Holotype.—♀, New York, A.N.S.

Neallotype.—♂, Maine, Dryden, 20.IX.1958, C.G.H.

Distribution

According to H. Townes, 1951: New York, New Jersey, Pennsylvania.

New records: Maine (C.G.H.), Indiana, Maryland (U.S.N.M.), New Hampshire, Virginia, North Carolina (M.C.Z.), Utah (C.N.C.).

Female

Abdomen distinctly tinged with blue in most specimens; head and thorax black; scutellum white except base; pronotal ridge white; mesoscutum usually with two short median stripes; no scopa; flagellum distinctly widened, the widest segment little more than twice as wide as long; length 11 mm.

Flagellum.—Bristleshaped, distinctly widened beyond the middle, moderately attenuated at the apex, with 34-35 segments, the first scarcely 2.5 times as long as wide, the tenth square, the widest little more than twice as wide as long. Black with white annulus on segments 7-12.

Head.—Temple profile distinctly narrowed with rounded outline; cheek profile distinctly narrowed with almost straight outline; malar space about half as long as the width of mandible base; mandibles strong. Black; the following white: small marks on sides of clypeus and orbits broadly all around the eye (narrowly interrupted usually at the vertex, always at the malar space, sometimes also at the temples, widened distinctly on the cheeks and the lower part of the face).

Thorax.—Area superomedia wider than long, usually weakly bordered anteriorly. Black; the following white: collare, pronotal ridge broadly, subalarum, scutellum except base, usually a mark on the prepectus laterally; mesoscutum with or without white median lines.

Legs.—Rather slender. Black; white are: apices of coxae I, the tibiae and the apex of femur I below; sometimes also the apex of coxae II, and the trochanters I, or I and II below, in part.

Abdomen.—Median field of postpetiolus, interval of gastrocoeli and extreme base of the third tergite in the middle finely striate; the apex of postpetiolus punctate; interval of gastrocoeli a little narrowed or of the same width than one of them. Black, usually with a distinct blue tint.

Male

Tyloides on segments 8-17, small, narrow, longish-oval; flagellum without annulus; malar space short, one third as long as width of mandible base. Mesoscutum with middle stripes; characteristic color of legs III black with the narrow apical border of the femora and a small mark on the base of the tibiae dorsally white. Length 11 mm.

In addition to the white pattern as described for the female, the following are white: mandibles, labrum, face and clypeus, cheeks in greater part, scape below, sometimes postscutellum, femora I and apical half of femora II below, apical half of coxae II, trochanters I and II below and tibiae II below, tibial spurs.

Variability

Two males from Georgia and Alabama (U.S.N.M.) have in addition to the other white pattern a white mark or crossband on the lower part of the mesopleuron. They may represent a southern subspecies.

Remarks

This small species is distinguished by its white scutellum and the blue tint of the abdomen. The latter was distinct in all specimens freshly collected by myself, but sometimes absent in specimens of museum collections. I do not know whether this character varies individually or fades gradually.

22. *Coelichneumon barnstoni* Morley

Coelichneumon barnstoni Morley, 1915, Rev. Ichn. Brit. Mus. 4: 130, ♂ (Morley's description (loc. cit.) of the female refers to a specimen of *Anisopygus*).

Types

Holotype.—♂, Hudson Bay, British Museum, London, No. 3b. 45.

Neallotype.—♀, Ontario, Upsala, 25.VI.1956, C.G.H.

Distribution

Eastern Transition and Canadian zones. Pennsylvania and Maryland (U.S.N.M.), Alberta, Wisconsin (C.H.T.).

Female

Black, the abdomen usually slightly tinged with blue; scutellum sometimes with small white marks laterally toward the apex; small scopa; mesoscutum especially in the anterior half of the median lobe very densely and finely punctured opaque; flagellum short, extremely widened, the widest segment more than four times as wide as long; length 15-18 mm.

Flagellum.—Bristleshaped-lanceolate, short and stout, extremely widened beyond the middle, strongly attenuated at the apex, with 38-40 segments, the first considerably less than twice as long as wide, the sixth square, the widest four to five times as wide as long. Black with white annulus on segments three or 4-12.

Head.—Temple profile somewhat narrowed with slightly curved outline; cheek profile distinctly narrowed with straight outline; cheeks not inflated; malar space a little more than half as long as width of mandible base. Black; the frontal orbits very narrowly and often a small dot on the vertical orbits, white.

Thorax.—Mesoscutum covered by a short pubescence, very finely and densely punctured, alutaceous between punctures and opaque, particularly in the anterior part of the median lobe; scutellum distinctly raised above the postscutellum triangular, the upper surface rather flat, densely and strongly punctured with sharp edges laterally at the base; horizontal part of the propodeum densely and strongly punctured including the areae superexternae, with complete areolation; area supermedia approximately horseshoe-shaped. Entirely black; sometimes scutellum with restricted white mark at the apex, or apically laterally.

Legs.—Femora strong; coxae III distinctly and very densely punctured, with small scopa. Black; tibiae I white below.

Abdomen.—Median field of the postpetiolus, middle of the second tergite and narrow base of the third striate; ovipositor slightly projecting. Black with a slight, more or less distinct bluish tint.

Male

Tyloides on segments 6-13, extremely small, very short oval, the longest covering not even the median half of the segment; flagellum with white annulus on segments nine or 10 to 15 or 16; anterior part of the mesoscutum opaque as in the female; length 16-19 mm.

Black, abdomen usually more distinctly tinged with blue than in the female. The following white: base of mandibles, labrum, sides of face and clypeus broadly, mark on scape below, sometimes lower part of frontal orbits narrowly, marks on vertical orbits, collare in part, posterior part of pronotal ridge, subalarum, mark on tegulae. Tibiae and metatarsus I whitish below, and sometimes also part of tibiae II below.

23. *Coelichneumon ater* (Cresson)

Ichneumon ater Cresson, 1864, Ent. Soc. Phila. Proc. 3: 138, ♀.

Types

Holotype.—♀, New York, A.N.S.

Neallotype.—♂, Maine, Dryden, June, 1959, C.G.H.

Distribution

According to H. Townes 1951: "New York, North Carolina, Michigan, Illinois, Alberta, Washington". New records: Quebec, British Columbia (C.N.C.), Maine, Vermont, Ontario (C.G.H.), Ohio (U.S.N.M.).

Female

Black; rarely scutellum marked inconsiderably with white at the apex; no scopa; mesoscutum strongly but not quite as densely punctured as in *barnstoni*, not opaque between punctures; flagellum stout, extremely widened, the widest segment four times as wide as long; length 16 mm.

Flagellum.—Bristleshaped-lanceolate, short and stout, extremely widened beyond the middle, strongly attenuated at the apex, with 39-40 segments, the first scarcely 1.5 times as long as wide, the fourth square, the widest four times as wide as long. Black with white annulus on segments 5-13 or 14.

Head.—Temple and cheek profile somewhat narrowed with slightly curved outlines; malar space half as long as the width of the mandible base; cheeks slightly inflated. Black; the following white: frontal orbits narrowly and obscurely in the middle part, sometimes very small spots on vertical orbits.

Thorax.—Mesoscutum strongly and rather densely punctured, smooth and shiny between punctures; scutellum flat with rather sharp lateral edges, distinctly punctured; area superomedia clearly horseshoe-shaped. Entirely black; sometimes collare and apex of pronotal ridge marked with white, rarely also apex of scutellum.

Legs.—Femora stout; coxae III not very densely punctured, shiny, without trace of scopa. Black; mark on the apex of femora I below and tibiae I below whitish.

Abdomen.—Median field of postpetiolus and middle of second tergite striate. Black.

Male

Flagellum with white annulus on segments 12-17 or 18; tyloides extremely small, very short-oval, on segments 7-14; apex of pronotal ridge white, sometimes also the apex of scutellum; sides of face and clypeus white; mesoscutum shiny between punctures; middle of tergites 1-3 striate; length 17-18 mm.

The following are white: base of mandibles, sides of face and clypeus broadly, mark on vertical orbits, apex of pronotal ridge, sometimes subalarum, sometimes two small marks or a narrow band at the apex of the scutellum, femora I below except base, apex of femora II below, tibiae I and basal segments of tarsi I below.

Remarks

Both sexes very similar to *barnstoni*. Easily distinguished in the female sex by the lack of scopa. In both sexes recognizable by the more shiny sculpture of the anterior part of the mesoscutum and the entire lack of bluish tint on the abdomen.

24. *Coelichneumon pumilionobilis* Heinrich

Coelichneumon pumilionobilis Heinrich, 1951, Bonner Zool. Beiträge 2: 251, ♀, ♂.

Coelichneumon pumilosimilis Heinrich, 1953, Journ. Wash. Acad. Sci. 43: 148, ♀, ♂.

Types

Holotype.—♀, Germany, Bayrischer Wald, Waldmuenchen, 800 m., 14.IX.1948, C.G.H.

Allotype.—♂, Austria, Steiermark, Graz-Goesting, 10.VIII.1950, C.G.H.

Distribution

Holarctic; in North America so far known only from Maine and Ontario (C.G.H.).

Female

Black; pronotal ridge and sides of the scutellum white; small scopa; flagellum strongly widened, the widest segment three times as wide as long; length 10-14 mm.

Flagellum.—Bristleshaped, strongly widened beyond the middle, little attenuated at the apex, with 31-33 segments, the first twice as long as wide, the eighth square, the widest three times as wide as long. Black; white annulus on segments six or seven to 12 or 13.

Head.—Temple profile and cheek profile rather strongly narrowed, with slightly curved outlines; malar space not much shorter than width of mandible base. The following white: inner orbits on frons, sometimes also on face, triangular marks on vertical orbits and sometimes the lower part of outer orbits.

Thorax.—Areolation of propodeum complete, the area superomedia clearly separated from area basalis, hexagonal and usually a little wider than long. Black; collar, sides of the scutellum, pronotal ridge entirely (rarely only in the apical part), subalarum, white.

Legs.—Coxae III finely and densely punctured, with small, indistinct scopa. Black; the following white: apex of femora I below, tibiae I below and sometimes apex of coxae I narrowly.

Abdomen.—Median field of postpetiolus, the middle of the second and third and the base of the middle of the fourth tergite striate; interval of the gastrocoeli narrow; sides of the anterior tergites with shallow and scattered small punctures. Black.

Male

Tyloides on segments 7-17, small, very short-oval; flagellum without annulus; area superomedia bordered all around, considerably wider than long. Black; sides of scutellum broadly white; legs III not white marked. Length 13 mm.

In addition to the white pattern described for the female, the following also white: mandibles except apex, clypeus, face, cheeks, scape below, tegulae, coxae I and II at apex, marks on trochanters I and II below, femora I below and apex of femora II, tibiae and tarsi I below and tibiae II below in part.

25. *Coelichneumon tauma* Heinrich

Coelichneumon tauma Heinrich, 1951, Bonner Zool. Beitrage, 2: 253, ♀.

Coelichneumon tauma Heinrich, 1953, Journ. Wash. Acad. Sci. 45: 148, ♀ (Holarctic element).

Types

Holotype.—♀, Austria, Steiermark, Kaiserau bei Admont, 1100 m., 10.VI. 1950, C.G.H.

Neallotype.—♂, Ontario, Regan, 10.VII.1944, C.N.C.

Hosts

Lexis bicolor Grote, C.N.C. *Choristoneura fumeriferana* Clemens, U.S.N.M.

Distribution

Holarctic; in North America, Eastern Canadian and Transition Zones: Ontario and Quebec (C.N.C.), Maine (C.G.H.), New York (M.C.Z.), Minnesota (U.S.N.M.).

Female

Black; pronotal ridge and sides of scutellum white; small scopa; flagellum moderately widened, the widest segment less than twice as wide as long; face and frons very densely and finely punctured, almost opaque; length 9-12 mm.

Flagellum.—Bristleshaped, moderately widened beyond the middle and moderately attenuated at the apex, with 33-35 segments, the first more than twice as long as wide, the thirteenth square, the widest less than twice as wide as long. Black with white annulus on segments 7-12.

Head.—Temple profile and cheek profile a little narrowed with distinctly curved outlines; cheeks rather wide, slightly inflated; malar space not much shorter than width of mandible base; clypeus, face and frons finely and densely punctured, nearly opaque. Black; only a spot on inner orbits at level of antennal base white.

Thorax.—Mesoscutum very densely and finely punctured, nearly opaque; scutellum a little raised above postscutellum, flattened and polished above; aerolation of propodeum complete, rather weak; area superomedia clearly defined anteriorly, widened horseshoe-shaped. Black; collar, pronotal ridge (sometimes only in the apical half) and sides of the scutellum, white.

Legs.—Coxae III densely and finely punctured with small, rather indistinct scopa. Black; apex of femora I below and tibiae I below, white.

Abdomen.—Gastrocoeli very large, triangular, with wide thyridia and very narrow interval; median field of the postpetiolus and the interval of the gastrocoeli finely striate; tergites two and three finely and rather densely punctured, without striation. Black.

Male

Tyloides on segments 9-15, small, short-oval, the longest extending over about the median half of the length of the segments; flagellum with white annulus on segments 13-18; area superomedia twice as wide as long, half-moon shaped; pronotal ridge, sides and apex of scutellum white.

In addition to the white pattern as described for the female, the following are white: orbits all around the eye (narrowly interrupted at the level of the lower ocellus and at the malar space, widened on the sides of the face), sides of clypeus

broadly, marks on coxae I, small marks at apex of coxae II and usually marks on prescutellar carinae.

Remarks

The female resembles in color and size *pomilionobilis*. It can easily be distinguished, however, by the almost opaque sculpture of the face and frons, which is smooth, sparsely punctured and distinctly shiny in *pomilionobilis* and by the considerably less widened flagellum.

26. *Coelichneumon navus* (Say)

Ichneumon navus Say, 1836, Boston Journ. Nat. Hist. 1: 229, ♀, ♂.

Types

Holotype.—Lost.

Host

1 ♀, Quebec, bred from the pupa of an unidentified Noctuid (C.N.C.); *Hyphantria cunea* (Dru.) (R. Mitchell).

Distribution

According to H. Townes 1951: "Atlantic to Illinois in Transit. and U. Austr. Zones". New records: Quebec, Ontario (C.N.C.), Maine, Kansas (C.G.H.).

Female

Black; pronotal ridge and sides of scutellum white; all tibiae and metatarsi with conspicuous white annulus at the base; small scopa; flagellum moderately widened; length 10-11 mm.

Flagellum.—Bristleshaped, nearly filiform, somewhat widened beyond the middle, slightly attenuated at apex, with 31-32 segments, the first a little more than twice as long as wide, the ninth square, the widest hardly twice as wide as long. Black with white annulus on segments 7-12.

Head.—Temple profile and cheek profile somewhat narrowed with slightly curved outlines; malar space half as long as width of mandible base. Black; the following white: inner orbits on face and frons up to level of lower ocellus, triangular marks on vertical orbits and often lower part of outer orbits.

Thorax.—Scutellum a little convex; area superomedia and basalis confluent. Black; collare, pronotal ridge, sides of scutellum and subalarum white.

Legs.—Moderately stout. Black; the following white: conspicuous annulus at bases of all metatarsi and tibiae, apex of femora I, or I and II below, and the whole ventral side of tibiae I; sometimes apex of coxae I, or I and II, and marks on trochanters I and II below.

Abdomen.—Median field of the postpetiolus, the middle of the second and the base of the third and fourth tergite in the middle striate. Black.

Male

Flagellum without annulus; malar space very short, one fourth as long as width of mandible base. Metatarsi white with black tip, the following tarsal segments white at the base in decreasing extent; the tibiae white banded as in the female; length 9-13 mm.

In addition to the white pattern as described for the female, the following are white: mandibles except tip, labrum, face, clypeus, cheeks, tegulae, femora I below, coxae I and II (usually except base), trochanters I and II and trochanters III below.

Variability

1 ♀, and 1 ♂ from Kansas (C.G.H.) are considerably more extensively marked with white. In the female the following additional parts are white:

orbits broadly all around the eye (narrowly interrupted only at vertex and malar space), all trochanters in greater part and apex of coxae I and II. In the male, marks of the sterna, a broad crossband on the metapleuron and the coxae III below are in addition white.

27. *Coelichneumon brunneri* (Rohwer)

Ichneumon brunneri Rohwer, 1914, Ent. Soc. Wash. Proc. 15: 180, ♀, ♂.

Types

Holotype.—♀, Montana, Missoula, U.S.N.M.

Host

Dioryctria auranticella (Grote), reared in Ontario and Montana from the same host.

Distribution

According to H. Townes 1951: Montana, Utah. New records: Ontario and Colorado (C.N.C.); Maine (C.G.H.).

Female

Black; scutellum black; pronotal ridge white; head strong; small, indistinct scopa; flagellum short, filiform, not widened (26-28 segments); length 9-10 mm.

Flagellum.—Short, filiform, neither widened or attenuated, with 26-28 segments, the first about twice as long as wide, the eighth square, the widest scarcely wider than long. Black with white annulus on segments 4-11.

Head.—Temple profile and cheeks profile very little narrowed, with curved outlines; malar space very short, about one third as long as width of mandible base; face and clypeus strongly and densely punctured. Black; the following white: frontal orbits narrowly not quite up to level of lower ocellus, extending downward to level of antennal base or beyond, marks on vertical orbits and lower part of outer orbits narrowly.

Thorax.—Rather flat; propodeum sloping down less strongly than usually; scutellum entirely flat, strongly punctured; areolation of the propodeum complete, area superomedia clearly defined anteriorly, approximately square. Black; collare, subalarum, pronotal ridge, rarely a narrow stripe on the sides of the scutellum, white.

Legs.—Stout, femora short; coxae III densely punctured with a small, but not dense, scopa. Black; apex of femora I and tibiae I below, white.

Abdomen.—Median field of postpetiolus and interval of gastrocoeli striate, the postpetiolus sometimes irregularly reticulate and partially punctate; tergites two and three strongly and rather densely, tergite four finely, punctured; gastrocoeli of medium size and depth; ovipositor projecting a little. Black.

Male

(Association of sexes proven by rearings of large series from the same host). *Tyloides* on segments 7-16, small and narrow, the longest covering about the median half of the length of the segment; flagellum without annulus; base of all tibiae and all metatarsi white; sides of the scutellum usually white, sometimes also the apex; length 10-11 mm.

The following are white: mandibles, labrum, clypeus, face (often with a more or less extensive black median mark), frontal orbits up to level to lower ocellus, marks on vertical orbits, scape below, outer orbits (usually from temple region downward, in the upper part covering half the width between eye and carina genalis, increasing gradually in width toward mandibles and covering often whole surface of cheeks, always excepting malar space), collare, pronotal ridge,

subalarum, marks on tegulae, usually sides of scutellum, often also its apex, occasionally only apex of scutellum, coxae I below, small marks at apex of coxae II (sometimes absent), usually trochanters I below and apical margin of trochanters II and III, femora and tibiae I below, apex of femora II, tibiae II externally except apically, internally at base, annulus at base of tibiae III (externally more extensive than internally), tarsal segments 1-2 or three of the tarsi I, basal half of metatarsus II and narrow base of metatarsus III.

Variability (males)

The following table of variability was based on a series of 16 males reared in Montana from *Dioryctria auranticella*.

TABLE III
Variability of white marking in 16 males
of *C. brunneri* Rohwer

Scutellum			Face		coxae II		cheeks	
only the apex of scutellum narrowly	sides of scutellum alone	sides of scutellum and apex	middle black	entirely white	apex narrowly white	entirely black	white to base of mandibles	apical margin of cheeks black
3	8	5	7	9	10	6	4	12

28. *Coelichneumon pervagus* (Cresson)

Fig. 12

Ichneumon pervagus Cresson, 1877, Amer. Ent. Soc. Trans. 6: 148, ♂.

Amblyteles pequoitorum Viereck, 1917, Conn. State Geol. and Nat. Hist. Survey Bull. 22: 345, 355, ♀.

Coelichneumon pervagus Heinrich, 1959, Ent. News 70: 207 (synonymization of *pequoitorum* with *pervagus*).

Type

Holotype.—*Ichneumon pervagus* Cresson, ♂, Canada, A.N.S. *Amblyteles pequoitorum* Viereck, ♀, Connecticut, Connecticut Agricultural Experimental Station, New Haven.

Host

Scoliopteryx libatrix Linnaeus in Nova Scotia (C.N.C.).

Distribution

According to H. Townes 1951: "New Hampshire, Connecticut, New York, Michigan". New records: British Columbia and Nova Scotia (C.N.C.), Maine (C.G.H.), Labrador (M.C.Z.).

Female

Wings clear; black; pronotal ridge and apex of scutellum white; scopa distinct; flagellum little widened; cheeks and temples distinctly narrowed; postpetiolus striate; abdomen with a very slight bluish tint; length 17-18 mm.

Flagellum.—Bristleshaped, little widened beyond the middle, attenuated at the apex, with 41 segments, the first little more than twice as long as wide, the twelfth square, the widest 1.3 times as wide as long. Black with white annulus on segments 8-12 or 13.

Head.—Cheek and temple profiles distinctly narrowed with slightly curved outlines; cheeks and temples not inflated; malar space a little more than half as long as width of mandible base. Black; the following often white: minute dots on sides of clypeus, inner orbits (extending downward somewhat beyond level of antennal base), marks on vertical orbits, a short and narrow stripe on the middle of the outer orbits.

Thorax.—Scutellum a little raised above the postscutellum; area superomedia smooth, narrowed anteriorly and usually confluent with the area basalis. Black; collar, pronotal ridge, apex of scutellum and sometimes a mark on the tegulae, white.

Legs.—Coxae III densely punctured all over, with conspicuous scopa. Black; apex of femora I below and the tibiae I below whitish.

Abdomen.—Median field of the postpetiolus and middle of the second and third tergites striate. Black; in fresh specimens usually with very slight bluish tint.

Male

Flagellum without annulus with narrow, longish-oval tyloides on segments 8-18; pronotal ridge and scutellum except base white; area superomedia transverse, smooth and shiny like the areae superoexternae; temple profile slightly rounded, considerably narrowed; coxae II and III very densely punctured; length 18-20 mm.

In addition to the white color pattern as described for the female, the following are white: mandibles except apex, labrum, clypeus (except a black mark apically in the middle), face (sometimes with a black mark in the middle), scape below, lower part of outer orbits (widened below over the greater part of the cheeks), tegulae, scutellum except base, a large mark on the prepectus laterally, usually a small mark on each side of mesosulcus at posterior end of mesosternum, apex of the coxae I and II, femora and tibiae I and II below, tarsi I below, sometimes apex of prosternum.

Remarks

Extremely similar to *orpheus* male but distinguishable by the constantly smaller size, narrower temples (fig. 12) and denser puncturation of coxae II and III.

29. *Coelichneumon orpheus* (Cresson)

Figs. 11 and 21

Ichneumon orpheus Cresson, 1864, Ent. Soc. Phila. Proc. 3: 136, ♀.

Types

Holotype.—♀, Pennsylvania, A.N.S.

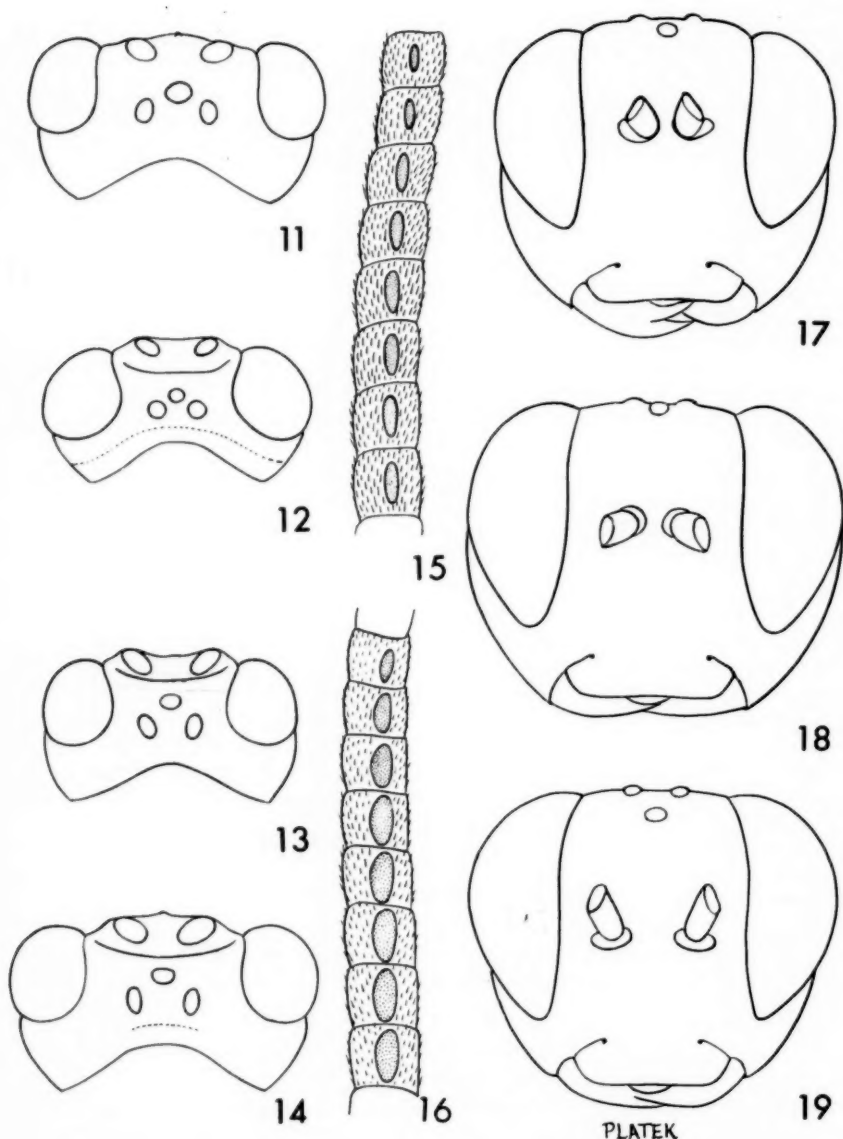
Neallotype.—♂, Maine, Dryden, I.X.1958, C.G.H.

Host

"Notodontidae pupa" (C.N.C.); *Ecpantheria deflorata* (F.) (U.S.N.M.).

Distribution

According to H. Townes 1951: "New York, Pennsylvania, Maryland, Ohio, British Columbia". New records: Quebec (C.N.C.), Maine (C.G.H.).



Figs. 11-19. 11, *Coelichneumon orpheus* (Cresson), ♂, temple profile; 12, *Coelichneumon pervagus* (Cresson), ♂, temple profile; 13, *Coelichneumon maurus* (Cresson), ♀, temple profile; 14, *Coelichneumon bistricus* (Cresson), ♀, temple profile; 15, *Protichneumon effigies* n. sp. ♂, tyloides; 16, *Protichneumon grandis* (Brullé), ♂, tyloides; 17, *Coelichneumon quadraticeps* n. sp., ♀, cheek profile; 18, *Coelichneumon azotus* (Cresson), ♀, cheek profile; 19, *Coelichneumon punctifer* n. sp., ♀, cheek profile.

Female

Wings moderately infuscated (less strongly at the base than toward the apex); black; in roughly 50% of the specimens, apex of scutellum and pronotal ridge white marked; no scopa; flagellum scarcely widened; areae superoexternae and superomedia not grossly sculptured, with only a few scattered punctures laterally; postpetiolus striate, sparsely punctured at the apex; length 20 mm.

Flagellum.—Bristleshaped, little widened beyond the middle, attenuated at the apex, with 43-44 segments, the first a little more than twice as long as wide, the eleventh square, the widest about 1.3 times as wide as long. Black with white annulus on segments eight or nine to 15 or 16.

Head.—Cheek and temple profile little narrowed, with curved outlines; cheeks and temples distinctly inflated; malar space a little less than half as long as width of mandible base. Black; frontal orbits and marks on the vertical orbits, white.

Thorax.—Scutellum flat; mesosternum slightly concave posteriorly, its posterior border distinctly raised; area superomedia approximately horseshoe-shaped. Black; in half of specimens scutellum and pronotal ridge apically white.

Legs.—Coxae III rather densely punctured externally, almost smooth with sparse puncturation on the inner side and apically, without trace of scopa. Black; apex of femora I below and tibiae I below, white.

Abdomen.—Median field of the postpetiolus and interval of the gastrocoeli striate; apex of postpetiolus punctate. Black.

Male

Wings as in the female slightly infuscated, lighter toward the base; flagellum without annulus, with narrow, longish-oval, tyloides on segments 8-19; pronotal ridge and scutellum except base white; area superomedia transverse, smooth and shiny as are the areae superoexternae; coxae II sparsely punctured, shiny; length 20-22 mm.

In addition to the white pattern as described for the female, the following are white: mandibles except apex, labrum, clypeus except a black median line or mark, face except black median line or mark, scape below, lower part of outer orbits (widened below over a greater part of cheeks), collare, pronotal ridge, subalarum, tegulae, scutellum except base, sometimes postscutellum, often a mark on the prepectus laterally, apex of coxae I and II, femora I and II below except base, tibiae I and II below, usually the basal segments of tarsi I below.

30. *Coelichneumon pepticus* (Cresson)

Ichneumon pepticus Cresson, 1877, Amer. Ent. Soc. Trans. 6: 148, ♂.

Types

Holotype.—♂, Illinois, A.N.S.

Neallotype.—♀, Colorado, U.S.N.M.

Distribution

According to H. Townes 1951: "Illinois, New Jersey". New records: Oregon Colorado (U.S.N.M.); Washington (C.H.T.).

Male

(Description based on the type)

Flagellum without annulus with narrow, longish-oval tyloides on segments 9-12; pronotal ridge broadly and scutellum except base white; mesoscutum sometimes (type) with white median stripes; postpetiolus with white apical band; white marks at apex of coxae III ventrally; cheeks slightly inflated; postpetiolus striate; length 18 mm.

The following are white: mandibles except apex, labrum, entire clypeus and face, frontal orbits, confluent with the marks of the vertical orbits, outer orbits (from the region of the temples downward widening gradually over the greater part of the cheeks except their apex and the malar space), scape below, collare, pronotal ridge broadly, subalarum, marks of the tegulae, scutellum except base, postscutellum, two short, converging median stripes on mesoscutum, a small mark at apex of pronotal base, a mark on prepectus laterally, large marks on coxae I and II, small marks at apex of coxae III below, femora I and II at apex below, tibiae I and II below, lines on tarsi I above and an apical band on postpetiolus.

Variability

Two male specimens from Colorado, (U.S.N.M.) have, in addition to the white pattern described above, two white marks on the mesopleuron and the apex of the prosternum white. Two other male specimens from Colorado lack the white median stripes of the mesoscutum. Two male specimens from Oregon (U.S.N.M.) have neither white stripes on the mesoscutum nor white marks on coxae III.

Female

Black; pronotal ridge broadly, scutellum and often two median lines of the mesoscutum white; no scopa; flagellum hardly widened; areae superoexternae and superomediae not grossly sculptured; postpetiolus striate with few scattered punctures; cheek profile not slightly narrowed as in *orpheus*, but rather strongly inflated, head in front view almost square. Otherwise like *orpheus* female; length 17 mm.

The following white: inner orbits downward below antennal base, marks on vertical orbits, line on outer orbits widened in the cheek region into a rounded patch, collare, pronotal ridge, subalarum, often two median stripes on mesoscutum, scutellum except base, apical mark on coxae I and apical band on postpetiolus.

Remarks

Closely related and in both sexes very similar to *orpheus*; differing only by the more strongly inflated cheeks and the white color pattern, especially the white apical band of the postpetiolus, which does not occur in *orpheus* but seems to be constant in *pepticus*.

So far I have seen no specimens from east of Illinois and therefore suppose a western distribution of the species. The record from New Jersey needs confirmation.

31. *Coelichneumon nigraticolor* (Viereck)

Amblyteles nigraticolor Viereck, 1917, Conn. State Geol. and Nat. Hist. Survey Bull. 22: 344, 355, ♀.

Types

Holotype.—♀, Connecticut, Branford, 9.IX.1904, Connecticut Agricultural Experimental Station, New Haven.

Neallotype.—♂, Maine, Augusta, 29.VI.1957 (A. E. Brower), C.G.H.

Distribution

According to H. Townes 1951: "Quebec, Rhode Island, Connecticut, Michigan". New records: Ontario (C.N.C.); Pennsylvania (U.S.N.M.); Maine (C.G.H.).

Female

Wings strongly infuscated; scutellum and subalarum white, pronotal ridge

black, sometimes marked with white apically; small scopa; carina oralis normal; flagellum not widened; temples and cheeks distinctly inflated; postpetiolus punctured; length 17-18 mm.

Flagellum.—Bristleshaped, not distinctly widened beyond the middle, strongly attenuated at the apex, with 46 segments, the first a little more than twice as long as wide, the tenth square, the widest hardly wider than long. Black with white annulus on segments 7-12 or 14.

Head.—Temple profile not narrowed, with strongly rounded outline; cheek profile a little narrowed with curved outline; cheeks and temples inflated; malar space about $\frac{2}{3}$ as long as width of mandible base; mandibles with rather blunt and short teeth. Black; frontal orbits narrowly, and small vertical spots, white.

Thorax.—Mesoscutum strongly punctured, distinctly longer than wide; notaulices obsolete; scutellum strongly convex, raised above postscutellum; area superomedia narrowed anteriorly and confluent with area basalis; edge between mesosternum and mesopleuron with a distinct hump posteriorly. Black; the following white: collare, scutellum and subalarum, sometimes apex of pronotal ridge.

Legs.—Femora III slender, rather densely and strongly punctured externally. Coxae III densely and strongly punctured with a small, somewhat raised scopa. Black; tibiae I white below.

Abdomen.—Slender; median field of the postpetiolus distinct, with scattered punctures and sometimes with indistinct, shallow striae; gastrocoeli large, the interval narrower than one of them, striate; surface of tergites 2-4 densely punctured. Black.

Male

Wings strongly infuscated; flagellum with white annulus on segments 7-12 and with short-oval tyloides on segments 8-19; scutellum and subalarum white; pronotal ridge marked with white, sometimes white; temples and cheeks slightly inflated; postpetiolus more densely punctured than in the female; length 16 mm.

The following white: small marks on sides of clypeus, inner orbits (more broadly on face than on frons), mark on vertical orbits, collare, subalarum entirely, marks on pronotal ridge or sometimes its whole length, apex of femora I and II internally and tibiae I below. Sculpture of the abdomen as in the female.

Remarks

Male specimens with white pronotal ridge are similar to *bistricus* males. They may be distinguished by the postpetiolus not being striate, by the frons not being concave, by the more inflated temples and the shorter-oval tyloides.

32. *Coelichneumon viola* (Cresson)

Figs. 25 and 29

Ichneumon viola Cresson, 1864, Ent. Soc. Phila. Proc. 3: 137, ♀.

Ichneumon vittifrons Cresson, 1864, Ent. Soc. Phila. Proc. 3: 143, ♂.

Types

Holotype.—*Ichneumon viola* Cresson, ♀, Pennsylvania, A.N.C. *Ichneumon vittifrons* Cresson, ♂, Delaware, A.N.C.

Host

According to H. Townes: "*Catocala* sp."

Distribution

According to H. Townes 1951: "Atlantic to 100°W. in Transit. and U. Austr. Zones". New records: Texas (U.S.N.M.); Florida, Ontario (C.N.C.).

Female

Wings strongly infuscated; pronotal ridge and scutellum black; large, flat-trimmed scopa; carina oralis running through in a straight, unbroken line to the hind corner of the mandible base, strongly laminately elevated, and sloping away from the mouth; flagellum slightly widened; postpetiolus punctured; frons not concave; length variable, usually between 16 and 18 mm.

Flagellum.—Bristleshaped, somewhat widened beyond the middle, strongly attenuated at the apex with 48 to 49 segments, the first about twice as long as wide, the ninth or tenth square, the widest about twice as wide as long. Black with white annulus on segments eight or nine to 16 or 17.

Head.—Temple and cheek profile narrowed moderately with slightly curved outlines; cheeks slightly inflated; malar space about $\frac{3}{4}$ as long as width of mandible base; frons not concave but flat at, or shortly below, level of lower ocellus. Black; the following white: frontal orbits narrowly and obscurely up to vertex and here usually connecting with vertical spots, outer orbits narrowly and obscurely from temple region downward beyond the middle.

Thorax.—Scutellum considerably raised above postscutellum and with sharp lateral edges; propodeum strongly areolated; area superomedia longer than wide, narrowed toward base, area basalis smooth; edge between mesopleuron and mesosternum without hump. Black, collare white.

Legs.—Femora III stout, externally with a few, shallow punctures; coxae III strongly and sparsely punctured at level of scopa, shiny; scopa of considerable size, evenly trimmed. Black; apex of femora I internally and the tibiae I below white.

Abdomen.—Median field of postpetiolus subobsolete; postpetiolus strongly and sparsely punctured, not striate; interval of gastrocoeli not striate; second and third tergite less strongly and densely punctured than in *histricus*. Black.

Male

Wings less strongly infuscated than in female, especially basally; flagellum without annulus; the unique character of the carina oralis developed as in the female; pronotal ridge and scutellum white, often also two median stripes on mesoscutum; apex of femora III narrowly, tibiae III above and usually metatarsus III above white; postpetiolus sparsely punctured; length 16-21 mm.

The following white: mandibles except apex, labrum, face and clypeus (except a longitudinal, percurrent, black median stripe), frontal orbits broadly up to vertex and usually connecting with vertical marks, outer orbits (widening gradually close to apex of cheeks), scape below, collare, pronotal ridge, subalarum, scutellum, postscutellum, tegulae in part or entirely, mark on prescutellar carinae, sometimes two median stripes on mesoscutum, coxae I except base, apex of coxae II, apices of femora I, II and III above, tibiae I, II and III above in their total length, segments 1-4 of tarsi I and II above except their narrow apices and usually metatarsus III above.

Remarks

The unique character of the carina oralis is sufficient for recognizing at once both sexes.

33. *Coelichneumon histricus* (Cresson)

Fig. 14

Ichneumon histricus Cresson, 1867, Amer. Ent. Soc. Trans. 1: 294, ♂.

Ichneumon germanus Cresson, 1877, Amer. Ent. Soc. Trans. 6: 143, ♀, new synonym.

Types

Holotype.—*Ichneumon histricus*, ♂, West Virginia, A.N.S. *Ichneumon germanus* Cresson, ♀, Massachusetts, A.N.S.

Distribution

According to H. Townes 1951, *bistricus*: "West Virginia"; *germanus*: "New Hampshire, Massachusetts, New York, Virginia". New records: Ontario, Prince Edward Island, British Columbia (C.N.C.), Maine (C.G.H.), Pennsylvania, Michigan, South Dakota (U.S.N.M.).

Female

Wings strongly infuscated; pronotal ridge and scutellum black, rarely the latter narrowly white at the apex; small, distinct scopa; carina oralis normal; flagellum little widened; postpetiolus striate; area superomedia horseshoe-shaped or hexagonal; frons distinctly concave including the level of lower ocellus; length 18-20 mm.

Flagellum.—Bristleshaped, somewhat widened beyond the middle, strongly attenuated at the apex, with 51-54 segments, the first 2.5 times as long as wide, the tenth or eleventh square, the widest little more than twice as wide as long. Black with white annulus on segments six or seven to 14 or 15.

Head.—Temple and cheek profile distinctly narrowed with nearly straight outlines; temples and cheeks not inflated; malar space longer than half width of mandible base; frons distinctly concave including the level of the lower ocellus. Black; frontal orbits narrowly and obscurely in the middle, and small marks on vertical orbits, white.

Thorax.—Scutellum considerably raised above the postscutellum, with sharp edges laterally at the base; propodeum completely and strongly areolated, strongly punctate-reticulate including anterior part; area superomedia about as long as wide at apex, horseshoe-shaped or hexagonal. Usually entirely black; sometimes the subalarum and the narrow apex of the scutellum are white marked.

Legs.—Femora moderately slender; femora III distinctly punctured; coxae III strongly and densely punctured with small scopa. Black; narrow apex of femora I internally and tibiae I below whitish.

Abdomen.—Median field of the postpetiolus regularly and densely striate; interval of gastrocoeli irregularly striate, rest of surface of tergite two and third tergite strongly and densely punctured, the fourth tergite densely and less strongly punctured; ovipositor scarcely projecting. Black.

Male

(Description based on the holotype of *bistricus*)

Wings strongly infuscated; black; pronotal ridge and scutellum white; flagellum with white annulus; tyloides longish-oval on segments 7-20; legs III entirely black; area superomedia transverse; frons slightly concave; postpetiolus striate; scutellum considerably raised; length 18 mm.

The following white: mandible base, labrum, face and clypeus (except a longitudinal, percurrent, black median band), frontal orbits up to level of lower ocellus, mark on vertical orbits, mark on lower part of outer orbits, scape below, collare, pronotal ridge, subalarum, marks on tegulae, scutellum, apical margin of prosternum, apex of coxae I, mark at apex of coxae II, base of trochanters I and II below, apex of femora I below, tibiae I and II below and annulus of flagellum.

Variability

The white pattern of this male seem to be relatively variable. The *white annulus* of flagellum extends usually from segment 10 or 11 to 15, 16 or 17, but is sometimes reduced to a white mark on only two segments or is lacking entirely. The *scutellum* may be entirely white, marked with white at the apex, or laterally toward the apex, or entirely black. The *outer orbits* and *tegulae* are sometimes

entirely black, and the white pattern of the *pronotal ridge* may be more or less reduced.

Remarks

This male is distinguished by the combination of the following characters: dark wings, striate postpetiolus, slightly concave frons and normal carina oralis. The sum of these characters seems to exclude an association with any other female except *germanus* Cresson.

34. *Coelichneumon maurus* (Cresson)

Figs. 13 and 22

Ichneumon maurus Cresson, 1864, Ent. Soc. Phila. Proc. 3: 135, ♀.

Types

Holotype.—♀, Virginia, A.N.S.

Neallotype.—♂, Pennsylvania, Spring Brook, C.G.H.

Distribution

According to H. Townes 1951: "Rhode Island and New York to Georgia". New records: Quebec, Ontario, Alberta, British Columbia, Northwest Territories (C.N.C.); California (C.G.H.).

Female

Wings strongly infuscated; pronotal ridge and scutellum black; large scopa; carina oralis normal; flagellum considerably widened; postpetiolus coriaceous-reticulate, usually with a few scattered punctures but without striation; area superomedia hexagonal; frons not concave at the level of the lower ocellus; length 19-22 mm.

Flagellum.—Bristleshaped, long, strongly widened beyond the middle and strongly attenuated at the apex, with 52-55 segments, the first little more than twice as long as wide, the eleventh square, the widest about three times as wide as long. Black with white annulus on segments 7-16 (narrower in California).

Head.—Temple and cheek profile distinctly narrowed with nearly straight outlines; temples and cheeks not inflated; malar space nearly as long as width of mandible base; frons not concave at or shortly below level of lower ocellus. Black; the following white: frontal orbits narrowly and obscurely in the middle, sometimes small marks on vertical orbits.

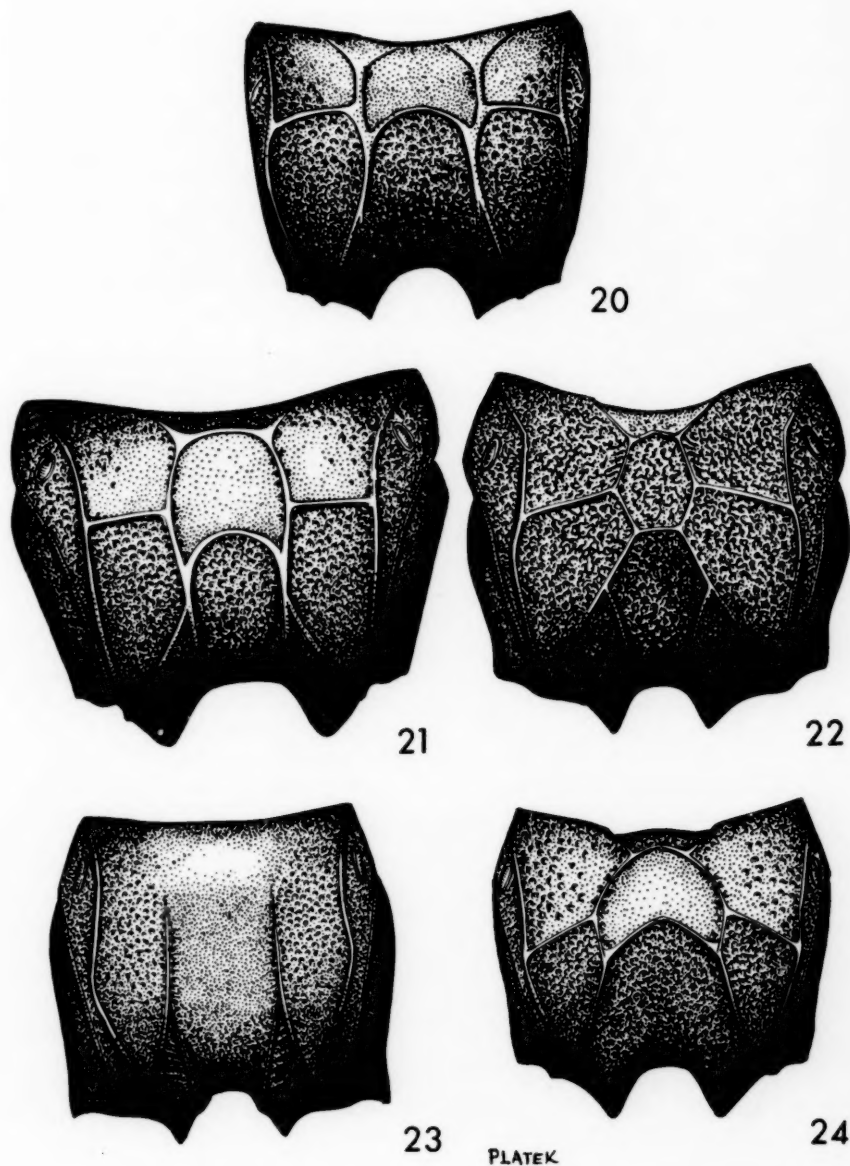
Thorax.—Scutellum considerably raised above postscutellum; propodeum completely and strongly areolated, strongly punctate-reticulate including the anterior areae; carina dentipara exterior bulging outward behind costula and strongly raised; area superomedia hexagonal, narrowed anteriorly and often also posteriorly, little, or no longer than wide, distinctly raised above level of areae superoexternae; mesosternum slightly concave posteriorly, its posterior border distinctly raised. Black.

Legs.—Femora moderately slender; coxae III strongly and densely punctured, less densely usually at level of scopa; scopa large, trimmed. Black, femora I at apex anteriorly and tibiae I below white.

Abdomen.—Median field of postpetiolus finely coriaceous-reticulate, opaque, with a few scattered punctures on apical part; interval of gastrocoeli with short striations; surface of tergites two and three neither densely nor very strongly punctured, with very fine, alutaceous undersculpture. Black.

Male

Wings strongly infuscated; pronotal ridge at least in part and usually marks laterally at the apex of the scutellum or its entire apex white; flagellum always



Figs. 20-24. 20, *Coelichneumon neocretatus* n. sp., ♀, propodeum; 21, *Coelichneumon orpheus* (Cresson), ♀, propodeum; 22, *Coelichneumon maurus* (Cresson), ♀, propodeum; 23, *Coelichneumon solutus* (Holmgren), ♀, propodeum (nearctic specimen); 24, *Orgichneumon calcatorius* (Thunberg), ♀, propodeum.

without annulus; tyloides longish-oval on segments 9-23; legs III black; area superomedial hexagonal, not transverse; frons not concave at the level of the lower ocellus; temples strongly narrowed; postpetiolus coriaceous-reticulate; scutellum considerably raised; femora III very slender, length 18 mm.

The following white: mandibles except base, labrum, sides of clypeus and face broadly, narrow frontal orbits up to level of lower ocellus, marks on vertical orbits, a short and narrow line in middle of outer orbits, scape below, collare, pronotal ridge more or less extensively, marks on tegulae and subalarum, often marks at apex of scutellum or its entire apex, marks on apices of coxae I or sometimes coxae I and II, femora I or I and II below except the base, tibiae I or I and II below, basal segments of anterior tarsi except apices above.

Sculpture of propodeum and anterior tergites and the structure and areolation of the propodeum as in the female.

Remarks

Closely related to and similar to *bistricus*. In both sexes specifically distinguished by the frons not being concave at all and by the different sculpture of the postpetiolus. Moreover, in the male the temples are more narrowed than in *bistricus*.

Compared with the large size and robust figure of the females the males of this species appear relatively small and slender.

35. *Coelichneumon terebratus*, new species

Types

Holotype.—♀, Colorado, Boulder (S. A. Rohwer), 12.X.1907, U.S.N.M.

Paratype.—♀, Colorado, Masonville, C.H.T.

Female

Black; pronotal ridge broadly white; apical half of scutellum white; wings strongly infuscated; no scopa; ovipositor projecting exceptionally far; mandibles narrow; flagellum strongly widened, the widest segment three times as wide as long; temples considerably narrowed with almost straight outline; length 18 mm.

Flagellum.—Bristleshaped, strongly widened beyond the middle, very strongly attenuated at the apex, with 47 segments, the first about 2.5 times as long as wide, the ninth square, the widest three times as wide as long. Black with white annulus on segments 7-13.

Head.—Temple profile considerably narrowed, with almost straight outline; cheek profile strongly narrowed with straight outline; malar space a little longer than width of mandible base; cheeks not inflated; mandibles tapering toward apex, slender, with relatively small teeth. Black; the following white: inner orbits on face and frons broadly, mark on vertical orbits, a short narrow line in middle of outer orbits and sometimes a longitudinal mark on cheeks (holotype).

Thorax.—As in *terebrifer*. Black; the following white: collare, pronotal ridge broadly, subalarum, mark on tegula and apical half of scutellum.

Legs.—More slender than in *terebrifer*, especially femora III; coxae III densely and strongly punctured, without scopa. Black; the following white: apices of femora I and II below and the tibiae I below.

Abdomen.—As in *terebrifer* but a little narrower. Black.

Remarks

Very closely related to *terebrifer*. Differing only by the more extensive white color pattern of the head and thorax and especially by the distinctly narrower temples. I suppose that this form represents the western vicariant of *terebrifer*, but on account of the different shape of the temples I prefer to presume specific separation rather than subspecific.

36. *Coelichneumon terebrifer*, new species**Types**

Holotype.—♀, Virginia, Vienna, 1913, U.S.N.M.

Paratype.—♀, Virginia, Chain Bridge, July 1912, C.G.H.

Female

Black; pronotal ridge narrowly white; wings strongly infuscated; no scopa; ovipositor projecting exceptionally far; mandibles narrow; flagellum strongly widened, the widest segment three times as wide as long; length 18 mm.

Flagellum.—Bristleshaped, strongly widened beyond middle, very strongly attenuated at apex, with 44-47 segments, the first about 2.5 times as long as wide, the ninth square, the widest three times as wide as long. Black with white annulus on segments 7-13.

Head.—Temple profile scarcely narrowed, with curved outline; cheek profile distinctly narrowed with straight outline; malar space about as long as width of mandible base; cheeks not inflated; mandibles tapering toward apex, slender with relatively small teeth. Black, the following white: frontal orbits, a mark on vertical orbits and a narrow, short line in the middle of outer orbits.

Thorax.—Scutellum a little raised above the postscutellum; propodeum short, strongly declivous posteriorly; area superomedia strongly transverse; apical part of the mesosternum concave, its posterior border distinctly raised; edge between mesosternum and mesopleuron with a pronounced hump posteriorly. Black; collar, and pronotal ridge narrowly in its whole length, or at apex, white.

Legs.—Moderately stout; femora rather slender; coxae III densely and strongly punctured, without scopa. Black; apex of femora I and tibiae I below, whitish.

Abdomen.—Rather wide, second tergite distinctly wider than long, third more than twice as wide as long; base of median field of postpetiolus, middle of second, and base of third, tergite, striate. Black.

Remarks

Closely related to *terebratus*. For the differences see *Remarks* under the latter.

37. *Coelichneumon flagellator*, new species**Types**

Holotype.—♀, Colorado, U.S.N.M.

Paratypes.—♀, California, Tallac Lake and 1 ♀, Colorado, U.S.N.M.

Female

Wings infuscated; black, legs (usually not including coxae) red; thorax not white marked; no scopa; flagellum short, extremely widened, the widest segment more than three times as wide as long; scutellum flat; abdomen sometimes partially red; length 17 mm.

Flagellum.—Bristleshaped, short and stout, extremely widened beyond middle, strongly attenuated at apex, the fifth segment square, the widest more than three times as wide as long. Black with white annulus on segments 6-12, scape red below.

Head.—Cheeks wide, somewhat inflated; malar space half as long as width of mandible base; mandibles normal. Black; frontal orbits narrowly, and marks on vertical orbits, white.

Thorax.—Scutellum flat; mesoscutum shiny, not very densely punctured; notaulices distinct at base; propodeum gradually sloping, area superomedia approximately horseshoe-shaped; area basalis not deepened; costulae weak. Black.

Legs.—Femora stout, coxae III without trace of scopa. Femora, tibiae and trochantelli red; apex of tibiae III infuscated, all tarsi blackish-brown.

Abdomen.—Rather slender, strongly attenuated at apex; median field of postpetiolus striate; gastrocoeli medium sized, their interval wider than one of them. Black, apices of the anterior tergites, especially second, obscurely red.

Variability

One female from California, Tallac Lake, differs from the holotype by considerably more extensive red color pattern. Legs red including coxae and trochanters; tergites 1-3 entirely, four and five apically, red; clypeus, side of face, collare, subalarum, tegulae, scutellum and postscutellum, are also red.

38. *Coelichneumon rubricoxa*, new species

Types

Holotype.—♀, California, U.S.N.M.

Allotype.—♂, California, Angora Lake, Tahoe, U.S.N.M.

Paratypes.—1 ♀, California, U.S.N.M.; 2 ♀♀, California, Yosemite Valley and Eldorado Co., C.H.T.

Female

Wings infuscated; black, legs including coxae red; thorax not white marked; no scopa; flagellum long, moderately widened, the widest segment scarcely twice as wide as long; scutellum considerably raised; abdomen sometimes partially red; length 17 mm.

Flagellum.—Bristleshaped, long and slender, moderately widened beyond the middle, very strongly attenuated, tenth segment square, widest scarcely twice as wide as long. Black with white annulus on segments 10-13, scape red below.

Head.—Cheek profile somewhat narrowed with slightly curved outline; cheeks very wide between eye and carina genalis; malar space one third as long as width of mandible base; mandibles normal. Black; inner orbits reddish, vertical marks white.

Thorax.—Mesoscutum shiny; notaulices distinct at base; scutellum considerably raised above postscutellum, gradually sloping at apex; area superomedia large, hexagonal, approximately as wide as long; costulae distinct; area basalis deepened. Black; subalarum, tegulae, and scutellum, obscurely red.

Legs.—Coxae III shiny below with scattered punctures, without trace of scopa. Uniformly light red.

Abdomen.—Postpetiolus grossly and densely punctured with irregular longitudinal reticulae; interval of gastrocoeli as wide as one of them or a little narrower. Black; anterior tergites sometimes obscurely reddish.

Male

Flagellum black, without annulus; scape ventrally red; facial orbits narrowly white; scutellum black; otherwise like the female; length 17 mm.

39. *Coelichneumon semilaevis* (Cresson)

Ichneumon semilaevis Cresson, 1864, Ent. Soc. Phila. Proc. 3: 142, ♀.

Types

Holotype.—♀, Colorado, A.N.S.

Neallotype.—♂, California, Leevining, 25.VI.1948 (H.M.G. and D. Townes), C.G.H.

Distribution

According to H. Townes 1951: "Colorado". New records: Quebec, Cap Chat; Northwest Territories, British Columbia (C.N.C.); California.

Female

Abdomen tinged with dark metallic blue; head and thorax without metallic tint; prescutellar carinae usually marked with white; legs red, tibiae and tarsi III infuscated; distinct scopa; flagellum moderately widened: length 17 mm.

Flagellum.—Bristleshaped, moderately widened beyond the middle and moderately attenuated at the apex with 47 segments, the first less than twice as long as wide, the ninth square, the widest scarcely twice as wide as long. Black.

Head.—Cheek and temple profile little narrowed, with slightly curved outlines; cheeks distinctly inflated; malar space half as long as width of mandible base. Black; frontal orbits narrowly and obscurely whitish as is a short stripe in middle of outer orbits; vertical orbits with a small white spot.

Thorax.—Scutellum flat, shiny and sparsely punctured as is mesoscutum; propodeum rugose-punctate, opaque; area superomedia narrowed anteriorly and indistinctly separated from area basalis. Black; prescutellar carinae sometimes white marked.

Legs.—Moderately slender; coxae III shiny and on inner side sparsely punctured; scopa small. Black; femora, tibiae and tarsi I and II and the femora III red.

Abdomen.—Median field of postpetiolus, middle of second and base of third and fourth tergites striate in the middle; rest of surface of tergites 2-4 rather densely but not strongly punctured. Dark metallic blue.

Remarks

This species has a striking resemblance to *purpurissatus* Perkins, which has the same color pattern but somewhat narrower cheeks and a little stouter femora.

Male

Flagellum without annulus; tyloides on segments 9-20, small, short-oval; pronotal ridge apically, scutellum laterally at apex and prescutellar carinae white; femora and tibiae I and II red, legs III infuscated; length 15-16 mm.

The following white: base of mandibles, labrum, sides of clypeus and face, frontal orbits not quite up to level of lower ocellus, marks on vertical orbits, a narrow stripe on lower part of outer orbits, collare, apical part of pronotal ridge, subalarum, prescutellar carinae, narrow stripes at apex of scutellum laterally.

Area superomedia transverse; scutellum flat.

40. *Coelichneumon jejunos* (Cresson)

Figs. 26, 28, 30

Ichneumon jejunos Cresson, 1864, Ent. Soc. Phila. Proc. 3: 186, ♂.

Ichneumon apertus Cresson, 1867, Amer. Ent. Soc. Trans. 1: 293, ♀.

Types

Holotype.—*Ichneumon jejunos* Cresson, ♂, Illinois, A.N.S. *Ichneumon apertus* Cresson, ♀, Illinois, A.N.S.

Distribution

According to H. Townes 1951: "Atlantic to 100°W. in Transit. and U. Austral. Zones". New records: Ontario, Quebec, British Columbia (C.N.C.). Montana (U.S.N.M.), Florida (C.G.H.).

Female

Black; pronotal ridge almost entirely black to entirely white; scutellum black, rarely with white apex; temples and cheeks strongly inflated; junction of carina oralis and carina genalis slightly elevated, forming a small, triangular projection which represents a unique character of the species; anterior border of clypeus

slightly bisinuate; mandibles stout, the teeth separated by a wide gap; propodeum long, gradually sloping; no scopa; abdomen narrow as in Chasmias; postpetiolus punctate or reticulate-punctate; flagellum widened; length 14-18 mm.

Flagellum.—Bristleshaped, widened beyond the middle, moderately attenuated at apex, with about 40 segments, the first little more than twice as long as wide, the ninth square, the widest about twice as wide as long. Black with white annulus on segments 7-13.

Head.—Temple and cheek profile not narrowed, with strongly curved outlines; cheeks and temples strongly inflated; head in front view almost square; clypeus with slightly curved sides and slightly bisinuate apex; mandibles stout, broad, relatively a little longer than in *azotus*, with strong teeth separated by a wide gap, upper longer than lower. Black; the following white: inner orbits (downward usually beyond level of base of antennae), vertical orbits (sometimes connected with outer orbits, sometimes interrupted at temples), outer orbits (extending downward to lower third of eye or less).

Thorax.—Mesoscutum and scutellum grossly and not very densely punctured; propodeum long, gradually sloping backward; area superomedia distinctly longer than wide, narrowed anteriorly, usually confluent with area basalis. Black; the following white: collar, subalarum at least in part, usually most of pronotal ridge, sometimes only the apex, often the apex of the scutellum.

Legs.—Femora stout. Black; apices of femora I below, and tibiae I below, white.

Abdomen.—Narrow, sharply pointed at apex, ovipositor distinctly projecting; median field of the postpetiolus indicated; postpetiolus punctured or reticulate-punctate; interval of gastrocoeli shortly longitudinally rugose or striate. Black.

Male

Flagellum without annulus, with narrow, longish tyloides on segments 8-20; pronotal ridge broadly, scutellum and sometimes two median stripes on the mesoscutum white; the small triangular projection at the junction of the carina genalis and carina oralis usually distinct as in the female; median field of the postpetiolus in contrast to the female usually striate with few scattered punctures at the apex; interval of gastrocoeli more strongly striate; tibiae III externally at the base with a white stripe of varying length, which is very rarely obsolete; length 14-16 mm.

In addition to the white pattern as described for the female, the following are white: mandibles except base, clypeus, face, orbits broadly around eye (interrupted at the malar space and sometimes also at vertex, widening on outer side over greater part of cheeks except their apex), tegulae, sometimes median stripes on mesoscutum, scutellum, sometimes postscutellum, apices of coxae I and II, trochanters I and II below, femora I and II below except base, tibiae I and II below, tarsi I and II in part and base of tibiae III externally. In southern specimens sometimes prepectus marked with white.

41. *Coelichneumon azotus* (Cresson)

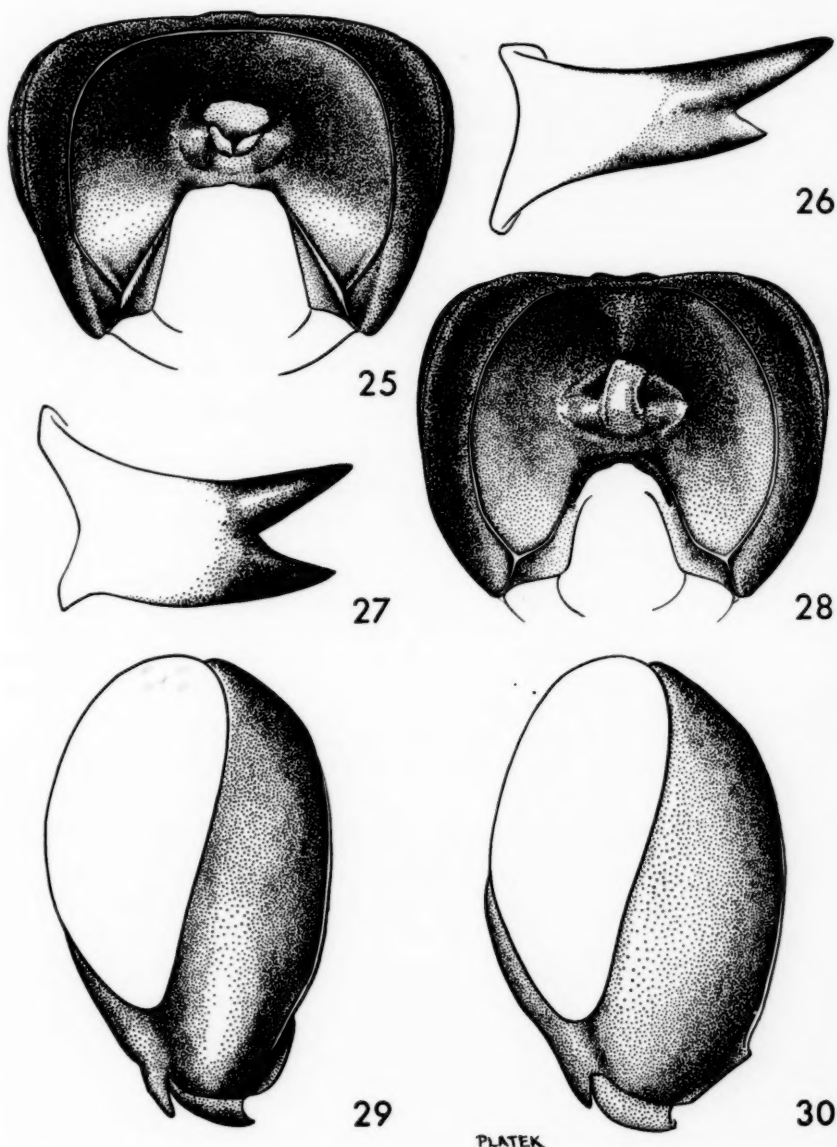
Fig. 18

Ichneumon azotus Cresson, 1864, Ent. Soc. Phila. Proc. 3: 150, ♂.

Ichneumon agnitus Cresson, 1864, Ent. Soc. Phila. Proc. 3: 151, ♀.

Types

Holotype.—*Ichneumon azotus* Cresson, ♂, Delaware, A.N.C. *Ichneumon agnitus* Cresson, ♀, Delaware, A.N.C.



PLATEK

Figs. 25-30. 25, *Coelichneumon viola* (Cresson), ♀, carina oralis; 26, *Coelichneumon jejurus* (Cresson), ♀, mandible; 27, *Coelichneumon quadraticeps* n. sp., ♀, mandible; 28, *Coelichneumon jejurus*, ♀, carina oralis; 29, *Coelichneumon viola*, ♀, head profile showing carina oralis; 30, *Coelichneumon jejurus*, ♀, head profile showing angular projection of carina oralis.

Distribution

According to H. Townes 1951: "Atlantic to 100°W. in U. Austr. Zone". New records: Ontario (C.N.C.), Quebec, Maine (C.G.H.).

Female

Black; pronotal ridge and scutellum except base white; postpetiolus often marked with white at the apex; distinct gray scopa; postpetiolus punctured; mandibles wide, the teeth separated by a wide gap; widest segment of flagellum 1.5 to 2 times as wide as long; face grossly and rather densely punctured; length 15-16 mm.

Flagellum.—Bristleshaped, distinctly widened beyond middle, moderately attenuated at apex, with 39-41 segments, the first fully twice as long as wide, the eighth square, the widest 1.5 to 2 times as wide as long. Black with white annulus on segments 7-14.

Head.—Temple profile and cheek profile distinctly, though not strongly, narrowed, with curved outlines, malar space a little more than half as long as width of mandible base; temples a little, cheeks considerably, inflated; mandibles stout and broad with strong teeth separated by a wide gap, upper tooth somewhat longer than lower; cheeks almost smooth; face grossly and rather densely punctured. Black; the following white: marks on the sides of clypeus and orbits broadly around eyes, interrupted at vertex and malar space (sometimes lacking on lower part of face or outer orbits).

Thorax.—Mesoscutum with gross, not dense punctation; scutellum shiny, slightly raised above postscutellum, with sharp edges laterally at base; area superomedia usually clearly separated from area basalis, approximately horseshoe-shaped. Black; the following white: collare, pronotal ridge broadly, subalarum, scutellum except base (white color usually projecting a little medially toward base of scutellum) and usually postscutellum.

Legs.—Femora stout; coxae III grossly and rather densely punctured, with conspicuous gray scopa. Black; apex of femora I or I and II below and tibiae I below, white.

Abdomen.—Postpetiolus with rather distinct, flat median field, more or less densely punctured without striation; interval of gastrocoeli shortly striate, middle of second and third tergites densely, sides sparsely, punctured. Black, apex of postpetiolus usually with a more or less distinct white mark medially.

Male

Flagellum without annulus, with small, short-oval tyloides on segments 8-16 or 17; scutellum white; prescutellar carinae never white; mesoscutum with two short, converging middle stripes; postpetiolus with a white apical band; apex of femora III narrowly, tibiae III externally white near to the apex or in the whole length, also tarsi III white striped above; length 15-17 mm.

In addition to the white pattern as described for the female, the following are white: mandibles except base, labrum, clypeus, face, scape below, orbits around eye broadly (interrupted narrowly at malar space and sometimes also at vertex, extending in the lower part of the outer side over the greater part of the cheeks except their apical margins), tegulae, median stripes of mesoscutum, coxae I and II except base, trochanters I and II below, femora and tibiae I and II below, tarsi I and II externally, narrowly at apex of femora III dorsally, external side of tibiae III (but usually not apex), segments 1-3 or four of tarsi III (except apices) dorsally.

Variability

Four males from Ontario and Quebec agree with the description above except that the white pattern of the tibiae and tarsi III are strongly reduced or entirely lacking.

42. *Coelichneumon walleyi*, new species

Types

Holotype.—♀, Ontario, Smoky Falls, Mattagami River, 31.VII.1934 (G. S. Walley), C.N.C. No. 6998.

Allotype.—♂, from the type locality, 25.VI.1934, C.N.C.

Paratypes.—2 ♂♂, from the type locality, 6.VII.1934; 1 ♂, Ontario, Mer Bleue, 22.VII.1933 (G. S. Walley); 1 ♂, Ontario, Ottawa, 16.VI.1954 (W. R. M. Mason), C.N.C.; 2 ♂♂, from the type locality, 25.VI.1934 and 5.VII.1934, C.G.H.

Distribution

Ontario (C.N.C.) and British Columbia (C.G.H.).

Female

Agrees with *azotus* Cresson female, except for the following differences; no trace of *scopa*; considerably smaller; flagellum with 35 segments (white annulus on segments 6-14); white color of scutellum reduced to a narrow apical band; area *superomedia* and *basalis* confluent; length 13 mm.

Male

Agrees with *azotus* male except for the following differences: considerably smaller; *mesoscutum* and *postpetiolus* without white pattern; white pattern of tibiae III reduced to a short stripe at the base externally; length 13 mm.

Remarks

The congruence of this form with *azotus* is striking. The constant and considerable difference in size, however, evident in the whole series from Smoky Falls, combined with the entire lack of *scopa* in the female seems to indicate specific difference rather than subspecific.

43. *Coelichneumon punctifer*, new species

Fig. 19

Types

Holotype.—♀, Maryland, Mayo Beach, 30.VII.1944, U.S.N.M.

Allotype.—♂, Virginia Nelson Co., 6.VIII.1927, C.G.H.

Paratypes.—♀, Virginia, County Club Hills, Arlington, 10.XI.1940; 1 ♀, 1 ♂, Maryland, Cabin John, 7.IX.1946 and 13.VIII.1916; 1 ♀, Virginia, Falls Church, 30.IX.1917; ♂, Virginia, Black Pond, Fairfax Co., 5.VIII.1922; ♂, Texas, Paris, 1904; ♂, New York, Nyack, 1883, U.S.N.M.; ♀, Virginia, Glencarlyn, 26.VII.1918; ♀, Maryland, Cabin John, VI.1918, C.G.H.

Distribution

New York, Maryland, Virginia, Texas.

Female

Black; pronotal ridge, apex of scutellum, prescutellar carinae and sometimes median stripes of the *mesoscutum* white; distinct *scopa*; *postpetiolus* punctured, without striation; mandibles short and wide, the teeth separated by a wide gap; similar to *azotus* but flagellum less widened, cheeks a little more inflated, face and clypeus more sparsely punctured; length 14-17 mm.

Flagellum.—Bristleshaped, hardly widened beyond the middle, attenuated at the apex, with 38-41 segments, the first a little more than twice as long as wide, the twelfth or thirteenth square, the widest 1.3 times as wide as long. Black with white annulus on segments 7-12 or 13.

Head.—Temple profile and cheek profile wide with rounded outlines, the former scarcely, the latter little narrowed; malar space half as long as width of mandible base; mandibles short and broad, with strong teeth separated by a wide gap, upper tooth a little longer than lower; cheeks and temples rather strongly inflated; cheeks almost smooth, face with a few scattered punctures. Black; the following white: frontal orbits (considerably widened above at level of lower ocellus) and orbits of vertex and temples (narrowed toward temples).

Thorax.—Mesoscutum with gross, scattered punctures; scutellum shiny, slightly raised above postscutellum, with sharp edge laterally at base; area superomedia not clearly separated from area basalis. Black; the following white: collar, pronotal ridge broadly, subalarum, prescutellar carinae, apex of scutellum, postscutellum and sometimes two longitudinal median stripes on mesoscutum (three out of eight specimens).

Legs.—Femora stout; coxae III densely and grossly punctured with conspicuous gray scopa. Black; apex of femora I, or I and II below, and tibiae I below, whitish.

Abdomen.—Postpetiolus punctured, without striation, its median field distinctly defined; interval of gastrocoeli striate; the middle of the second to fourth tergites densely, their sides sparsely punctured. Black.

Male

Flagellum without annulus; tyloides on segments 8-18, small, short-oval; mesoscutum with middle stripes; apex of scutellum and prescutellar carinae broadly white; postpetiolus with white marks at the apex laterally; tibiae III white externally to about the middle or even beyond; length 14-18 mm.

In addition to the white pattern described for the female, the following are white: mandibles except apex, clypeus, face, scape below, outer orbits broadly (extending below over the whole surface of the cheeks except their apex at the mandible base), tegulae, scutellum except base, apical marks on postpetiolus, apical marks on coxae I and II, femora I and II below except base, tibiae I and II below, tibiae III externally to the middle or beyond, tarsi I and II laterally, rarely also tarsi III externally in part.

Remarks

In the *azotus*-group (punctured postpetiolus, stout mandibles) this species is at once recognizable in both sexes by the white mark on the prescutellar carinae.

44. *Coelichneumon quadriceps*, new species

Figs. 17 and 27

Types

Holotype.—♀, Maryland, Plummers Island, 28.IX.1912, U.S.N.M.

Allotype.—♂, Virginia, C.H.T.

Paratypes.—♀, Virginia, Great Falls, 21.IX., C.G.H.; 2 ♀, Michigan, C.H.T.

Distribution

Michigan, Virginia, Maryland, West Virginia.

Female

Black; pronotal ridge and scutellum except base white; no scopa; cheeks and temples very wide, head in front view almost square; mandibles very wide and short; mesoscutum short, almost as wide as long; flagellum long, little widened, the widest segment not much wider than long; length 12-15 mm.

Flagellum.—Bristleshaped, long, little widened beyond middle, strongly attenuated at apex, with 43 segments (holotype), the first twice as long as wide, the twelfth square, the widest scarcely wider than long. Black with white annulus on segments six or seven to 12 or 13.

Head.—Temple profile and cheek profile wide, not narrowed, with rounded outlines; outline of head in front view approximately square; malar space about as long as width of mandible base; mandibles short and wide with strong, subequal teeth separated by a wide gap; frons and face strongly punctured, the clypeus flat and almost smooth with straight anterior border. Black; the following white: inner orbits broadly on face and frons, triangular mark on vertical orbits and the outer orbits from below the temple region downward close to apex of cheeks (gradually widening).

Thorax.—Short; mesoscutum about as wide as long, strongly and rather densely punctured; propodeum short, strongly and densely punctured except area superomedia and areae superoexternae which are smooth; aerolation complete, the area superomedia transverse. Black; the following white: collare, pronotal ridge, subalarum, tegulae in part and scutellum except base.

Legs.—Femora slender; coxae III strongly and densely punctured, without trace of scopa. Black; apex of femora I below, and tibiae I below, whitish.

Abdomen.—Postpetiolus without median field, densely and regularly punctured; gastrocoeli smaller and less deepened than usual in the genus, their interval wider than one of them; second and third tergite strongly and evenly, the fourth more finely, punctured, all without striation; second tergite distinctly longer than wide, all following tergites transverse, the apex of abdomen of a blunt appearance; ovipositor projecting only a little. Black.

Male

Flagellum with annulus on segments 10 or 12 to 21; narrow base of tibiae III white above.

The following white: mandible base, labrum, face, clypeus, scape below, inner orbits broadly up to the level of lower ocellus, marks on vertical orbits, outer orbits (as in the female widening downward over greater part of cheeks but not extending to mandible base), collare, pronotal ridge, subalarum, tegulae in part or entirely, scutellum except base, coxae I and II except base, trochanters I and II below, femora I below more or less extended, apex of femora II below, tibiae I and II below, base of tibiae III above narrowly and base of tarsi I, or I and II.

45. *Coelichneumon neocitimus*, new species

Types

Holotype.—♀, Yukon Territory, Dry Creek, 25.VII.1948 (Mason and Hughes), C.N.C. No. 7003.

Allotype.—♂, Northwest Territories, Fort Smith, 5.VII.1950 (G. B. Wallis), C.N.C. No. 7003.

Female

Black; wings moderately but uniformly infuscated; small scopa faintly indicated; scutellum black, convex, strongly punctured, carinated laterally at the very base; flagellum somewhat widened; clypeus with oblique sides, slightly convex medially; area superomedia large, hexagonal, close to rectangular; length 16 mm.

Flagellum.—Bristleshaped, somewhat widened beyond the middle, strongly attenuated at the apex, with 47 segments, the first little more than twice as long as wide, the seventh or eighth square, the widest fully twice as wide as long. Black with white annulus on segments 7-13.

Head.—Temple profile scarcely narrowed, with strongly curved outline; cheek profile distinctly narrowed, with slightly curved outline; malar space little shorter than width of mandible base; clypeus with oblique sides, its median part distinctively convex; mandibles relatively slender with small teeth. Black with small white vertical spots.

Thorax.—Mesoscutum densely punctured anteriorly; notaulices subobsolete; scutellum convex, densely and strongly punctured, carinated laterally at the very base; propodeum rather short, areae dentiparae strongly slanting, but not really curved, their apices not approaching the bases of the coxae III very closely, carina dentiparae exteriores and carina metapleurales not converging; area superomedia large, slightly transverse and slightly narrowed in front of the costulae, hexagonal, almost rectangular; mesosulcus not crenulated. Entirely black.

Legs.—Moderately slender; coxae II and III densely punctured, the former with some sparse hairiness internally at the apex. Black, tarsi more blackish-brown; tibiae I whitish below.

Abdomen.—Postpetiolus relatively short, and wide, finely rugose basally, sparsely punctured apically; gastrocoeli large, triangular, the interval narrower than one of them, not striate; tergites 2-4 rather densely and uniformly punctured, the following tergites smooth and shiny; ovipositor projecting only a little. Black.

Male

Black; scutellum narrowly white at the apex; flagellum with white annulus; tyloides longish-oval on segments 6-21; wings uniformly moderately infuscated; sides of face and clypeus white; scutellum, clypeus and sculpture like the female; length 17 mm.

The following white: upper half of mandibles, sides of clypeus, sides of face (somewhat widened above clypeal foveae), scape below, small spots on vertical orbits, subalarum, narrow apex of scutellum, femora I below except base, apical third of femora II below and tibiae I and II below.

Area superomedia smaller than in holotype, approximately square; interval of gastrocoeli rugose. Mesosulcus not crenulate; mesoscutum alutaceous between punctures.

Remarks

The systematic position of this species is not entirely clear. In sculpture and in the structure of the propodeum it approaches *Icheumon* but seems to be still closer to *Coelichneumon*.

The male associated above with the female holotype is rather similar to the male type of *citimus* Cresson from New Hampshire. It differs from *citimus* as follows:—

TABLE IV
Characters to distinguish males of *C. citimus* (Cress.)
from *C. neocitimus*, new species.

<i>neocitimus</i>	<i>citimus</i>
mesosulcus not distinctly crenulate; area superomedia square, rather small; mesopleuron below speculum slightly deepened; mesoscutum alutaceous between punctures; tyloids on segments 6-21; scutellum moderately convex and not very strongly carinated laterally at the base; apex of scutellum white.	mesosulcus strongly crenulate; area superomedia very large, transverse; mesopleuron below speculum strongly deepened; mesoscutum smooth between punctures; tyloids on segments 9-22; scutellum strongly convex and strongly carinated laterally on the basal third; scutellum black.

46. *Coelichneumon citimus* (Cresson)

Ichneumon citimus Cresson, 1877, Amer. Ent. Soc. Trans. 6: 144, ♂.

Ichneumon germanus Townes, 1951, Synoptic Catalog, p. 303, partim.

Types

Holotype.—♂, New Hampshire, White Mountains, A.N.S.

Male

(Description based on the type.)

Wings strongly infuscated; *flagellum* with white annulus on segments 10 (apex) to 17 (base) and longish-oval tyloides on segments 9-22; *scutellum* carinated laterally at the base; strongly convex, grossly punctured; *postpetiolus* with clearly defined, irregularly longitudinally rugose median field; *tergites* 2-4 with gross and very dense reticulate-punctate sculpture on the entire surface; *area superomedia* large, widened, horseshoe-shaped; *posterior border of mesosternum* not distinctly raised; *mesosulcus crenulate*; *legs* III entirely black; *length* 17 mm.

The following are white: *mandible* base, *labrum*, sides of *clypeus* and *face* broadly, *basal part of frontal orbits*, *marks on vertical orbits*, *mark on subalarum*, *apex of femora* I and II below, and *tibiae* I and II below.

Remarks

So far I have not found any other male specimen from the east matching the holotype of *citimus* Cresson nor was I able to associate this male with any of the females known to me. The infuscated wings of the type narrow the choice of possible associations considerably. We can exclude *viola* and *maurus* from the beginning. But the sculpture of the *postpetiolus* and *tergites* 2-4, the black color of *legs* III, the features of the *mesosternum* and the shape of the *areae superomedia* do exclude *histricus* as well. So *citimus* may be considered as a distinct species of which *neocitimus*, new species, perhaps may be a northwestern variant.

47. *Coelichneumon albicoxa*, new species**Types**

Holotype.—♂, Michigan, Ann Arbor, 24.V.1959, C.G.H.

Paratypes.—2 ♂♂, North Carolina, Raleigh and Wisconsin, Branch Co., C.H.T.; 1 ♂, Ontario, Vineland, W. Putman, 3.VII.1928, C.N.C.

Distribution

Wisconsin, Michigan, North Carolina, Ontario.

Male

Flagellum with white annulus; *tyloides* on segments 7-16, short-oval, small, the longest covering hardly more than the median third of the segment; *pronotal ridge* broadly, and *scutellum* except the base narrowly, white; *areolation of the propodeum* complete; *area superomedia* small, approximately horseshoe-shaped; *median field of the postpetiolus* regularly striate; *coxae* III mainly white above and below.—*Length* 17 mm.

Head.—*Temple profile* and *cheek profile* strongly narrowed with straight outlines; *malar space* one third as long as width of *mandible* base. Black; the following white: *mandibles* except apex, *labrum*, *clypeus* except a black median mark, *face* except a black median mark, *frontal orbits*, a mark on *vertical orbits*, *scape* below and a mark on lower part of *outer orbits*.

Thorax.—*Mesoscutum* densely punctured, especially anteriorly; *scutellum* slightly convex. Black; the following white: *collare*, mark on apex of *pronotal base*, *pronotal ridge*, *subalarum*, *tegulae*, *scutellum* except base narrowly, *post-scutellum*, the border of the *prepectus* laterally and a mark on lower part of *mesopleuron*.

Legs.—Slender. Black with extremely extensive white color on coxae; the following white: all coxae (except narrow base and restricted black marks on coxae III laterally), trochanters I and II below and partially above, femora I and II and tibiae I and II below, basal segments of tarsi I in the middle; tibiae III partially lighter ventrally.

Abdomen.—Median field of postpetiolus clearly defined, regularly striate; middle of second tergite and the bases of third and fourth in the middle, striate, the rest of these tergites densely punctured; gastrocoeli deep, a little wider than their interval. Black.

Remarks

I was unable to associate this chromatically very distinct male with any of the known females. I suspect that the matching female may be very similar to *ater* Cresson.

48. *Coelichneumon nigrosignatus* (Viereck)

Ichneumon (*Barichneumon*) *nigrosignatus* Viereck, 1905, Kans. Acad. Sci. Trans. 19: 297, ♂. *Ichneumon nigrosignatus* Townes, 1951, Synoptic Catalog, p. 408 (Unplaced species).

Types

Holotype.—♂, Arizona, Oak Creek Canyon, 6000 feet. University of Kansas, Lawrence, Kansas.

Male

Very small; black, scutellum white; legs III uniformly black; flagellum without annulus; mandibles and carina oralis normal; median field of postpetiolus striate-punctate; length 8 mm.

The type specimen looks like a dwarfed *pervagus* male, but is only about one third as large as such. It agrees in color with the latter. I think it represents a distinct species but a comparative diagnosis can not be formulated until more specimens are known.

Remarks

I had no opportunity to examine the type and to place this species until November, 1959 when it was already too late to incorporate the species in the key to the males of the genus *Coelichneumon*, where it would run to No. 39 (*pervagus* Cresson).

4. Genus *Coelichneumonops* Heinrich

Coelichneumonops Heinrich, 1958, Can. Ent. 90: 739.

Type-species.—(*Coelichneumonops vockerothi* Heinrich) = *Ichneumon solutus* Holmgren.

Propodeum not sloping backwards abruptly as in typical species of the genus *Coelichneumon* but slanting gradually down toward the base of coxae III. Postpetiolus neither striate nor punctate, but finely coriaceous, alutaceous or smooth. Gastrocoeli smaller and considerably shallower than in *Coelichneumon*, sometimes transverse, with alutaceous thyridia. Areolation of the horizontal part of the propodeum weak, sometimes the carination defining the median areae obsolete.

Small species 9-11 mm. long. In females of the three known species, flagellum little widened and without annulus. Otherwise like *Coelichneumon*.

The genus seems to be of boreal origin and distribution.

Key to the Species of the Genus *Coelichneumonops* Heinrich of America North of Mexico

Females and Males

1. Abdomen red, except the greater part of the first segment; legs mainly black; interval of gastrocoeli narrower than one of them. (Apex of scutellum laterally white marked; flagellum with 32 segments; length 11 mm.) 4. *walkleyae*, new species
- Abdomen black; legs mainly fulvous red; interval of gastrocoeli as wide or wider than one of them. (Scutellum entirely black; flagellum with 37 segments.) 2
2. Femora, tibiae and tarsi III uniformly fulvous red. (Horizontal part of the propodeum densely sculptured, opaque; area superomedia weakly or incompletely surrounded by carinae; sides of the clypeus, or face and clypeus, of males, white marked; length 10 mm.) 1. *solutus* Holmgren
- At least tarsi III and narrowly apex of tibiae III blackish. 3
3. Femora III entirely red, also tibiae III except the apex narrowly. (Region of the area basalis and superomedia polished, neither area defined by carinae; male unknown; length 10 mm.) 2. *cashmani* Heinrich
- Femora III broadly black at the apex, tibiae III black above, red below. (Head entirely black; length 9 mm.) 3. *occidentalis* Roman

1. *Coelichneumonops solutus* (Holmgren)

Figs. 8 and 23

Ichneumon solutus Holmgren, 1895, *Ichn. Suec.* I, p. 145, ♀.

Coelichneumon solutus Roman, 1909, *Naturw. Unters. Sarekgebirge*, 4: 213, ♀, ♂.

Coelichneumonops vockerothi Heinrich, 1958, *Canad. Ent.* 90: 739, 740, ♀, ♂. New synonym.

Types

Holotypes.—*Ichneumon solutus* Holmgren, ♀, Sweden, Naturhistoriska Riksmuseet. Stockholm; *Coelichneumonops vockerothi* Heinrich, ♀, Quebec, Great Whale River, 24.VII.1949 (J. R. Vockeroth), C.N.C. No. 6779.

Neallotype.—*Coelichneumonops vockerothi*, ♂, Quebec, Fort Chimo, 24.VII.1948 (E. H. N. Smith), C.N.C.

Distribution

Circumpolar in the subarctic regions of the Old and New Worlds; in Europe recorded from Finland, Lapland and Sweden; in North America boreoalpine: Hudsonian Zone of Quebec and Mt. Washington, New Hampshire.

Female

Black; trochantelli, femora, tibiae and tarsi uniformly fulvous red; flagellum without annulus, little widened beyond the middle; frontal and vertical orbits white; length 10 mm.

Flagellum.—Bristleshaped, slightly widened beyond the middle, moderately attenuated at the apex, with 37 segments (in European as well as American specimens), the first segment twice as wide as long, about the tenth square, the widest about 1.5 times as wide as long. Black without annulus.

Head.—Temple and cheek profile rather strongly narrowed, the former with slightly curved, the latter with straight outline; malar space longer than width of mandible base; cheeks not inflated, smooth and shiny with scattered shallow and fine punctures; mandibles normal. Black; frontal orbits narrowly and obscurely, and marks of the vertical orbits, white.

Thorax.—Mesoscutum and scutellum distinctly convex, shiny, rather strongly, but not densely, punctured; notaulices subobsolete; propodeum finely coriaceous-reticulate and punctured, opaque except the metapleura, which are shiny and densely punctured; areolation of the horizontal part incomplete, at least the costulae and the carinae bordering the area basalis lacking; in the American specimens also the limitation of the anterior part of the area superomedia obsolete; areae dentiparae sloping gradually down in an oblique plane. Entirely black.

Legs.—Moderately slender; coxae III finely and not very densely punctured, apically on the inner side with sparse hairs not forming a distinct scopa. Uniformly fulvous red except trochanters and coxae which are black.

Abdomen.—Narrow; postpetiolus rather wide with indistinctly limited median field, very finely and irregularly reticulate with few scattered punctures; gastrocoeli rather shallow and not large, their interval distinctly wider than one of them, their outline almost quadrangular, widened toward the outer border of the tergite; thyridia very finely alutaceous, opaque. Entirely black.

Male

Flagellum without annulus; with very small tyloides on segments 7-15; the tyloides narrow, short-oval, the longest ones not covering more than about the median third of the segments; scutellum considerably more raised than in the female; sides of the clypeus and face broadly white, the white areas on the sides of the face tapering gradually toward the level of the antennal base; orbits of the vertex with small white marks.

Remarks

By courtesy of Mr. Eric Kjellander I received from the Stockholm Museum paratypes of *solutus* Holmgren for examination. Their comparison with paratypes of my species *vockerothi* unveiled the synonymy of both. In the American specimens I found the carination of the propodeum somewhat more obsolescent than in the European. Otherwise they were identical.

2. *Coelichneumonops cashmani* Heinrich

Coelichneumonops cashmani Heinrich, 1958, Can. Ent. 90: 740, ♀.

Types

Holotype.—♀, Yukon Territory, Firth River, 69°30'N, 139°31'W, 17.VIII.1956 (E. F. Cashman), C.N.C. No. 6780.

Female

Black without any white marks on head, thorax and abdomen; legs red, apex of tibiae III and the tarsi III blackish; apical segments of tarsi I and II infuscated; length 10 mm.

Flagellum.—Bristleshaped, hardly widened beyond the middle, moderately attenuated at the apex, with 37 segments, the first twice as long as wide, the tenth square, the widest only 1 1/3 times as wide as long. Black, without annulus.

Head.—Temple and cheek profile rather strongly narrowed but not quite as much as in *solutus*; cheek profile slightly curved; malar space longer than the width of the mandible base; cheeks hardly inflated, smooth and shiny, with scattered fine punctures. Entirely black.

Thorax.—Mesoscutum and scutellum relatively flat, glossy with scattered, shallow punctures; notaulices subobsolete; horizontal part of the propodeum rather densely and distinctly punctured except the region of the areae superomedia and basalis which is glossy and not defined by any carinae. Entirely black.

Legs.—Moderately slender; coxae III shiny, sparsely and finely punctured; without scopa. Fulvous red, coxae and trochanters black, the narrow apex of tibiae III and the tarsi III blackish, apical segments of tarsi I and II infuscated.

Abdomen.—Postpetiolus wide and convex, the median field indistinctly limited, polished with a few scattered punctures; gastrocoeli narrow in the longitudinal direction, triangular, approximately as wide as the interval; second tergite and the basal part of the third regularly though not strongly and not very densely punctured, shiny. Entirely black.

3. *Coelichneumonops occidentalis* (Roman), new combination and new status

Coelichneumon solutus occidentalis Roman, 1934, Ann. Mag. Nat. Hist. (10) 14: 606, ♂.

Types

Holotype.—♂, Greenland, Jameson Land, British Museum, London, No. 3b2056.

Neallotype.—♀, Baffin Island, Frobisher, C.N.C. No. 7077.

Distribution

Greenland; Arctic Zone of Quebec: Payne Bay (C.N.C.); Baffin Island, Frobisher (C.N.C.).

Male and Female

Black including face and clypeus; femora and tibiae red, the broad apex of femora III and the tarsi III black, the tibiae III black above, red below; length 9 mm.

Male

Scutellum rather strongly convex and elevated above the postscutellum; area superomedia rugose, clearly bordered laterally, not separated from the area basalis; median field of the postpetiolus well defined; tergite 2-4 densely punctured, alutaceous between punctures, opaque.

Female

Agrees with *cashmani* in structure and sculpture of head, flagellum, mesoscutum and propodeum; space of area basalis and superomedia smooth and shiny as in *cashmani* and without bordering carination; sculpture of abdomen different from *cashmani*: postpetiolus not polished, but distinctly, irregularly longitudinally rugose with scattered punctures, second and third tergites rather strongly and more densely punctured, interval of gastrocoeli irregularly longitudinally rugose; gastrocoeli a little less distinctly impressed.

Remark

The male from Arctic Quebec agrees exactly in color with the holotype from Greenland. The fact that the typical *solutus* Holmgren occurs in Hudsonian Quebec (Ft. Chimo) adjacent to the Arctic Zone (Payne Bay) seems to exclude the correctness of Roman's subspecific hypothesis. Without doubt *occidentalis* is a distinct species, different from *solutus*. It could however perhaps represent an eastern subspecies of *cashmani*. Differences in the sculpture of the abdomen render such association a little doubtful.

4. *Coelichneumonops walkleyae*, new species

Types

Holotype.—♀, British Columbia, Vancouver, I.V.1940, U.S.N.M.

Female

Abdomen red except the first segment; head and thorax black; pronotal ridge narrowly, and two marks laterally at the apex of the scutellum, white; no scopa; flagellum not widened; gastrocoeli transverse with narrow interval; postpetiolus and first tergite neither striate nor punctate but very finely alutaceous; ovipositor distinctly projecting; length 11 mm.

Flagellum.—Bristleshaped, slender, rather short, not widened beyond the middle, moderately attenuated at the apex, with 32 segments, the first twice as long as wide, the eighth square. Black, without annulus.

Head.—Temple profile and cheek profile moderately narrowed with slightly curved outlines; malar space almost as long as the width of the mandible base:

cheeks slightly inflated. Black; the following white: the mandible base, small spots on the sides of the clypeus, two very small dots on the upper border of the face medially, inner orbits narrowly up to level to lower ocellus and down below the level of antennal base, a short stripe on the vertical orbits and a short, narrow stripe on the lower half of the outer orbits.

Thorax.—Scutellum almost flat; propodeum finely punctured except the median area; gradually and not strongly sloping toward the apex; areolation rather weak; area superomedia longer than wide, somewhat narrowed anteriorly and not separated from the area basalis, which is deepened on both sides; costulae slightly indicated. Black; the following white: collare, pronotal ridge narrowly, mark on tegula, subalarum and two spots on apex of scutellum laterally.

Legs.—Coxae III very densely and finely punctured without trace of scopa; femora rather stout. Black; the following white: small marks at the apex of coxae I and II, apex of femora I and II below, tibiae I below and the apical border of trochanters I and II.

Abdomen.—Postpetiolus with distinct, flat median field, finely alutaceous and opaque with very few scattered punctures near the apex; the second tergite and the base of the third of the same fine sculpture without any punctures; the following tergites smooth; gastrocoeli little deepened, transverse, with narrow interval; thyridia almost obsolete, alutaceous; ovipositor distinctly projecting. Red; the first segment black except a red apical band.

Remark

Named for Miss Luella M. Walkley in appreciation for her assistance during my work on the material of the Smithsonian Institution.

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